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TRANSMITTAL LETTER

USEPA (SR-6J)

77 West Jackson Blvd.

Chicago, IL 60604

Date: July 12, 2007

Project No.: 933-6154

Sent by:	
[] Mail	[] Under Separate Cover
[] Courier	[X] Federal Express
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Quantity	Item	Description
1	Сору	S/S/S Treatability Study Phase III Results, RUTGERS Organics Corporation, Nease Chemical Site, Salem, Ohio
		·

Remarks:

cc: Luanne Vanderpool, 1 copy Sheila Abraham, 1 copy Tim Christman, 1 copy Kevin Palombo. 1 copy



Per: Allen Kane/Steve Finn



"Mitchell, Stuart (Philly)" <stuart_mitchell@golder.com

To

07/12/2007 07:05 AM

Subject Nease Chemical Site, Salem, Ohio - Revised Treatability Study Technical Memorandum; Golder Project No.: 933-6154

History:

This message has been replied to.

Mary,

Please find attached for your review a copy of the Revised Stripping/Stabilization/Solidification Treatability Study Technical Memorandum. This revised Technical Memorandum incorporates comments received from the Agencies. Provided below is our responses to the Agencies comments.

If you should have any questions or require additional information, please do not hesitate to call me at 856-793-2005, ext. 34478.

Stuart			

S/S/S Treatability Study Phase IV Proposal – Response to Agency Comments

General overarching comments

1. Extrapolation of the bench scale tests to field treatability studies: The air stripping bench scale tests were conducted for 135 minutes. However, Golder proposes to use a 90 minute period for the Phase IV verification testing. The recommendation seems to be based on extrapolation (apparent exponential decrease) of the 10, 30, 60 and 135 minutes VOC concentrations analytical data. However, the data seems to indicate additional good reduction in the 90 – 135 minute period. How will the time period used during the Phase IV studies be used to support recommendations for full scale implementation? Are there specific parameters that we should be evaluating for field implementation?

Response:

There was additional volatile removal from 90 to 135 minutes; however, the performance goal for remediation is the reduction in leachability based on the combined effect of both air stripping and stabilization. By 90 minutes, air stripping had achieved over 80 percent removal in both samples and the removal rate was declining. Based on the Agencies' comment, we plan to run two parallel tests during Phase IV. One sample will be stripped for 90 minutes and one sample will be stripped for 135 minutes.

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2. Note also the variability in the time continuum % decrease in VOC concentrations between the samples destined for the cement-flyash treatment (sample # SE0190-015) and cement lime kiln (sample # SE0190-016). Although the overall VOC % decrease in both samples at 135 minutes is around 85%, SE0190-015 has an initially greater % decrease (51.3% at 10 minutes; 59.4% at 30 minutes) versus SE0190-016 (17.8% at 10 minutes; 39.6% at 30 minutes). At the 60 minutes the % removals are reversed, with SE0190-016 showing a marginally greater % removal (63%, versus 60%). Also, in SE0190-015, there is an increase in 1,2-dichlorobenzene between the 30 minutes and 60 minutes, although it then decreases at 135 minutes. This may be within the limits of sample

variability, but if not, when does the trend reverse? Given the somewhat differing VOC removal trends in samples with the same initial VOC levels and handled in the same manner, it would be helpful to have data between 60 and 135 minutes to support the extrapolation of the 90 minute proposed air stripping period.

Response:

These differing rates of removal over time are likely due to the heterogeneous nature of the material and within the limits of sample variability. As noted above, parallel samples will be run during Phase IV using both 90 and 135 minute periods.

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3. Since 1,2-dichlorobenzene appears to be the least well stabilized in the bench tests, what issues does Golder anticipate during the field implementation, particularly given the issues with dechlorination in the NZVI pilot?

Response:

For the air stripped samples, the tests achieved 98-99% removal in 1,2-dichlorobenzene in the total VOC analysis and 94-95% reduction in the SPLP VOC analysis. While 1,2 dichlorobenzene may be the most difficult contaminant to treat, these tests indicate that field performance can meet the ROD goals.

performance can meet the ROD goals.

4. Lime kiln versus fly ash: Although lime kiln and fly ash 21 day cures achieve very similar results in terms of % removal, in absolute VOC concentration and SPLP analyses terms, the lime kiln dust achieves lower VOC concentrations. While acknowledging sampling variability and all the

uncertainties associated with extrapolating these results to field, is the cost-benefit of using fly ash a substantive difference, enough to justify its use over lime kiln? Does Golder have any data on the

Response:

field performance of one over the other?

Our initial evaluation of reagent costs shows that fly ash is significantly less expensive than lime kiln dust (\$25/ton vs. \$41). Both have been used successfully to stabilize organic and inorganic constituents in soil. For the full scale implementation, we intend to give the contractor some flexibility regarding the reagent and percent mixture if they can demonstrate that they can meet

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Suggestions/ clarifications for the final S/S/S Technical Memo

remediation performance criteria to be agreed with the Agencies.

The following suggestions may be useful in drafting the S/S/S Treatability Study Technical Memo, when finally submitted.

5. Please include the results of all study phases in the complete/ final technical memo.

Response:

At the conclusion of the S/S/S treatability study, a complete report on the results of the various phase of the treatability study will be included with the final technical memorandum that will be submitted.

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6. Decreased concentrations in control sample: Please discuss the substantive differences between VOC concentrations in Untreated Material A, B and C and that in the "control" sample. Was the control sample collected and handled before analysis in the same way as Untreated Material A, B and C? The control samples also had an approximate loss in VOC concentration of approximately 25%

(11% to 44% depending on the constituent) at the end of the 21 day period- what was this due to? How were the control samples maintained? Are there any lessons learnt that can be factored into remedial design?

Response:

Differences were noted in the total VOC concentrations between the initial untreated material and the control samples. These differences are likely related to the heterogeneous nature of the material (samples cannot be completely homogenized without unacceptable loss of volatiles). To rectuce the effect of differences related to sample heterogeneity, the parent material proposed for Phase IV testing will be tested for total VOCs on a fast turn around basis to verify that a representative sample of the site material is being tested.

7. Table 1: The results presented for the Untreated Material (A, B, and C) differ from that provided for the samples collected in Pond 2 in Phase 1. Were additional samples collected to characterize the untreated material?

Response:

No additional samples were collected. The differences between the samples are most likely due to the naturally heterogeneous nature of the material.

or

8. Why are the Air Stripping (AS) Parent Mixture VOC concentrations higher (across all constituents) than the ZVI Parent Mixture? Were the parent mixtures handled differently at the beginning of the study? It is also interesting that VOCs such as ethyl benzene and carbon tetrachloride show up in the AS and ZVI Parent Mixtures and not in the Untreated Material characterization, even though the levels of other VOCs shown as detected are not that different.

The differences between the samples are most likely related to the naturally heterogeneous nature of the material of the material.

- 9. Table 2 and Table 3: Several VOCs (for example, carbon tetrachloride, ethyl benzene, o-xylene) are not included as a parameter, even when detected in the AS Parent Mixture (per Table 1 and Table 4). All detected VOCs should be included, to arrive at a more accurate removal %.
 - Response:

Tables 2 & 3 have been revised to include all VOCs. There were no material differences in the calculated percent removal rates.

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10. Figure 1: Do the tables refer to those within another workplan? (They are not provided here). If they are not relevant to this study, add that to the footnote.

Response:

The tables noted on Figure 1 refer to draft tables provided by the treatability laboratory; these tables will be included in the final report. Notes identifying them as draft tables have been added to the figure.

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recipient, is strictly prohibited. If you are not the intended recipient, please notify the sender and delete all copies. Electronic media are susceptible to unauthorized modification, deterioration, and incompatibility. Accordingly, the electronic media version of any work product may not be relied upon.



TECHNICAL MEMORANDUM

TO: Mary Logan, USEPA DATE: July 12, 2007

FR: Joe Gormley, Randy White, Steve Finn OUR REF: 933-6154

RE: STRIPPING/STABILIZATION/SOLIDIFICATION (S/S/S) TREATABILITY STUDY PHASE III RESULTS, NEASE CHEMICAL SITE, SALEM, OHIO (REVISED)

The purpose of this memorandum is to provide a status update of the Stripping/Stabilization/Solidification (S/S/S) Treatability Study, including the Phase III results, and to propose the treatment method and reagent formulation for USEPA/Ohio EPA approval before proceeding with the final phase (IV) of the Study.

1.0 SCOPE/OBJECTIVES

The scope of the Treatability Study is described in the Pre-Design Investigation Work Plan (PDI Work Plan; Golder Associates, September 2006). The overall objective of the S/S/S technology is to reduce the chemical leachability of the treated volume to mitigate future releases of chemicals to groundwater from former Ponds 1 and 2. The primary objective of the S/S/S Treatability Study is to determine the most appropriate methods and admixtures for full-scale operation that will result in adequate strength (to support the construction of a geosynthetic cap) and substantial reduction of chemical leachability.

The treatability testing is being conducted in four phases:

- Phase I Field Sampling and Baseline Characterization;
- Phase II Screening Tests;
- Phase III Intermediate Tests; and
- Phase IV Verification Tests.

During Phase I, Golder Associates identified an area in former Pond 2 that exhibited elevated chemical impacts and, with USEPA/Ohio EPA approval, collected samples from this location for use in the S/S/S treatability study. After receiving the samples, the laboratory homogenized the material to create a "parent mixture" while seeking to minimize loss of volatiles and performed baseline physical, chemical, and leachability (SPLP) testing to define the characteristics of the untreated material and to confirm that it represented the material observed in the field.

In Phase II, the parent mixture was treated with 10 different stabilization/ solidification (S/S) admixture formulations to determine the strength properties of the mixtures. Based on these test results, and with the approval of the USEPA/Ohio EPA, the following two admixtures were selected for further evaluation:

- 7.5% Portland Cement / 15% Class "C" Flyash; and
- 7.5% Portland Cement / 15% Lime Kiln Dust.

2.0 PHASE III TESTING

Phase III - Intermediate Testing was designed to determine the benefits of in-situ air stripping of the soils prior to solidification/stabilization (S/S), as well as the potential benefits of zero-valent iron (ZVI) amendments to the formulations selected in Phase II. As defined in the PDI Work Plan, the primary goals of Phase III were the following:

- to compare the treatment benefits of air stripping versus ZVI addition;
- to evaluate total constituent and SPLP concentration reduction achieved by the selected S/S formulations; and
- to ultimately select the final treatment approach for verification testing in Phase IV.

The steps of Phase III testing are shown in Figure 1 and described below.

2.1 Air Stripping Evaluation

A portion of the initial parent mixture was selected for the air stripping evaluation and submitted for total constituent and SPLP analysis of TCL VOCs. The results for these analyses were comparable to the results for the initial analyses of the parent material (see Tables 1 and 1a).

Two aliquots (SE0190-015 and SE0190-016) were then subjected to a bench-scale simulation of in-situ air stripping. To simulate air stripping, the soils were mixed using a Hobart mixer in a sealed glove box and maintained at approximately 55°F. Flow rate, temperature, and humidity of the influent and effluent air were continuously recorded. VOCs emitted during the mixing were carried by the sweep gas out of the glove box to an absorbent carbon cartridge. A sampling tee upstream from the carbon was used to continuously monitor total VOC concentrations of the sweep gas with a PID. Figures 2 and 3 show the PID concentrations over time for the two aliquots. Excel® was used to apply trendlines to the data shown on the figures. The sudden drops in PID readings are associated with sampling episodes as described below.

Samples from the treated soils were collected at elapsed times of approximately 10, 30, and 60 minutes after the start of mixing/air stripping and analyzed for total constituent concentrations of TCL VOCs. The soil sample analyses results are summarized in Tables 2 and 3 and Figures 2 and 3 show the soil concentrations in relation to the PID readings. Applying trendlines with best fit to these figures shows that the soil concentration (as well as PID results) appear to be decreasing exponentially. Figures 4 and 5 plot the decrease in soil concentration along with the percent removal. From these figures it can be seen that greater than 80 percent of total VOCs were removed from the material in approximately 90 minutes.

2.2 ZVI Evaluation

A portion of the initial parent mixture was selected for the ZVI evaluation and analyzed for TCL VOCs on a total constituent concentration basis, as well as in SPLP extracts. The results were comparable to those for the initial analysis of the parent material (see Tables 1 and 1a). Two all quots of the ZVI parent mixture (SE0190-017 and SE0190-018) were then treated with the addition of granular (40 μ m-1,200 μ m) ZVI. The ZVI was added to the samples in amounts corresponding to approximately five times the stoichiometric amount estimated for treatment of all VOCs and SVOCs (as determined in "parent" baseline sampling).

2.3 Control Samples

A control sample was taken from the parent material at the beginning of Phase III testing (Untreated Control - Day 0). The total VOC and SPLP results for this control sample are shown in Tables 1 and 1a and indicate lower levels of contaminants then any of the treatment samples. The unreated control sample was then placed in a zip lock bag and stored at room temperature for 21 days. After 21 days a sample was collected (Untreated Control - Day 21) and submitted for total constituent and SPLP analysis of TCL VOCs (refer to Tables 1 and 1a). The untreated control sample results for the 21 day sample show significant decreases in total VOCs and a lesser decrease in SPLP VOCs over the same time period. These changes may be related to volatilization, heterogeneity of the material, or sampling procedures.

2.4 Formulation Evaluation

Following air stripping and ZVI addition, the stripped samples (SE0190-015 and SE0190-016) and the two ZVI treated samples (SE0190-017 and SE0190-018) were mixed with the selected stabilization agents (7.5% Portland Cement/15% Class C Fly Ash and 7.5% Portland Cement/15% Lime Kiln dust) and allowed to cure for 21 days. After 21 days, the samples were analyzed for concentrations of TCL VOCs on a total constituent concentration basis and in the SPLP extract. The results for these analyses along with percent removals are summarized on Tables 4 and 4a.

3.0 CONCLUSIONS/NEXT STEPS

3.1 Conclusions

The results of Phase III testing demonstrate the following:

- The optimum duration for air stripping was 90 minutes.
- Both the air stripping and ZVI treatment trains provided significant percent reductions in total VOCs; however, the air stripping treatment train provided significantly greater percent reductions in leachability compared to the ZVI treatment;
- The Cement/Class C Fly Ash and the Cement/Lime Kiln Dust formulations provided similar percent reductions in total VOCs and leachable VOCs; and
- Air stripping along with either the Cement/Fly Ash or the Cement/Lime Kiln Dust formulation appears to provide the best treatment and stabilization formulation for meeting the goal of mitigating future release of chemicals to groundwater from former Ponds 1 and 2.
- Prior to the next phase, the parent material proposed for Phase IV testing should be tested for total VOC analysis on a fast turn-around basis to verify that a representative sample of the site material is being treated.

3.2 Next Steps

Subject to USEPA/Ohio EPA approval, Golder Associates proposes to perform Phase IV verification testing on two samples in the following manner:

- Perform rapid-turn-around TCL VOC analysis of both samples to verify that the testing will be performed on representative material;
- Perform total TCL semi-VOC, SPLP TCL VOCs, and SPLP TCL semi-VOC analyses to define the baseline condition;
- Perform air stripping on one sample for 90 minutes and on the other sample for 135 minutes;
- Stabilize both samples with 7.5% Portland Cement and 15% Class C Fly Ash*;
- Allow both samples to cure for 21 days;
- Perform Total and SPLP VOC and SVOC analyses on both samples; and
- Perform strength testing on both samples.

^{*} Note: Fly ash is significantly less expensive than lime kiln dust (\$25 per ton versus \$41 per ton for 35, 000 tons) and appears to afford the same level of treatment.

Table 1 S/S/S Treatability Study

Phase III Testing Results - Comparison of Control Sample and Parent Mixture Testing Results Summary of Total Volatiles Analyses - EPA Method 8260B

Nease Chemical Site

Results (µg/Kg)	Untreated	d Material Charac	terization	Control	Testing	Air Stripping and ZVI Testing		
ricodito (µg/11g)				《新州沙安山西南部	Untreated Control -	AS Parent	ZVI Paren	
Total	Untreated - A	Untreated - B	Untreated - C	Day 0	Day 21	Mixture	Mixture	
Volatiles Analysis	Result	Result	Result	Result	Result	Result	Result	
Acetone						-	-	
Benzene	51,400	43,900	48,500	3.600	961	46,200	31,500	
Bromobenzene	-	-	-	-			-	
Bromochloromethane	ATTER TOUR			-				
Bromodichloromethane								
Bromoform						A THE REAL PROPERTY.		
Bromomethane				Rendered - Marine		-		
2-Butanone								
n-Butylbenzene			-				IN UT IN THE	
sec-Butylbenzene	Miscould make	and the line						
tert-Butylbenzene								
Carbon disulfide			-				-	
Carbon tetrachloride			10 - 10			6,640	4,370	
Chlorobenzene	30,300	29,000	29,500	3,910		31,200	20,400	
Chlorodibromomethane								
Chloroethane		-			-		-	
2-Chloroethyl vinyl ether		-			- 10 10	-		
Chloroform				The section is		-		
Chloromethane			•		- 1	-		
2-Chlorotoluene		-		D. D 6 11 1		-		
4-Chlorotoluene	-	- 4			•	*	*	
2-Dibromo-3-chloropropane			-		- 1	-		
1,2-Dibromoethane		-	-			-	•	
Dibromomethane	3,880,000	0.440.000	0.000.000	- 000,000	231,000	3.840.000	2,690,00	
1,2-Dichlorobenzene	3,000,000	3,410,000	3,330,000	892,000	231,000	3,040,000	2,030,00	
1,3-Dichlorobenzene 1,4-Dichlorobenzene	29,600	27,500	26,500	6,840	1,580	30,100	19,500	
Dichlorodifluoromethane	29,600	27,500	26,500	0,040	1,500	30,100	19,500	
1,1-Dichloroethane								
1,2-Dichloroethane							-	
1,1-Dichloroethene				1.00				
cis-1,2-Dichloroethene								
trans-1,2-Dichloroethene								
1,2-Dichloropropane					-			
1,3-Dichloropropane					W. C. V. S.		-	
2,2-Dichloropropane			4/10/10				-	
cis-1,3-Dichloropropene		Market and the	-					
trans-1,3-Dichloropropene	Maria de Como							
1,1-Dichloropropene					Consultation - Land Consultation	Diffus Bulk		
Ethylbenzene				The same of the sa	Establish Control	10,100	6,250	
2-Hexanone							-	
Hexachlorobutadiene			18,600	6,430	1,250	11,900	7,940	
Isopropylbenzene		The second second		3,650		15,000	9,310	
p-Isopropyltoluene			POT A SECUL			MACHINE WAS	- 11	
4-Methyl-2-pentanone			-			-	-	
Methylene chloride			M 159- 110					
Naphthalene	W	-	-			132,000	5,520	
n-Propylbenzene	-				•		-	
Styrene		2000-	-		-		-	
1,1,1,2-Tetrachloroethane	241,000	- 000,000	400,000		10.100	107.000	400.00	
1,1,2,2-Tetrachloroethane	241,000	202,000	192,000	22,600	10,100	197,000	126,000	
Tetrachloroethene Toluene	966,000 35,900	874,000	888,000	161,000	18,700	977,000	648,000	
1,2,3-Trichlorobenzene	35,900	31,400	33,400	3,710		36,400	23,700	
1,2,4-Trichlorobenzene				103 - 10 - 5 6		10.00	-	
1,1,1-Trichloroethane	-			No.		-	•	
1,1,2-Trichloroethane	F 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			36 11 20 3	-			
Trichloroethene	73,600	59,900	63,600	7,670	1,870	69,800	49,600	
Trichlorofluoromethane	73,600	59,900	-	7,670	1,870	69,800	49,600	
1,2,3-Trichloropropane				-				
1,2,4-Trimethylbenzene			100		1 1 1 1		-	
1,3,5-Trimethylbenzene					- /11 (2)			
Vinyl acetate		-				-		
Vinyl chloride		100 200	78. 11. 18.78					
o-Xylene	- 100	-				7,990	4,750	
m, p -Xylene	30,200	26,300	29,700	5,900		39,000	24,500	
,	25,200	20,000	20,700	0,300		00,000	24,500	
Totals	5,338,000	4,704,000	4,659,800	1,117,310	265,461	5,450,330	3,671,34	

Table 1a

S/S/S Treatability Study

Phase III Testing Results - Comparison of Control Sample and Parent Mixture Testing Results Summary of SPLP Analyses - EPA Method 1312/8260B Nease Chemical Site

Salem, Ohio

			AND THE RESIDENCE OF THE PARTY	Dhio							
Results (µg/L)	Untreated	Material Charac	terization	TREE CARGO AND STATE OF DATE	Testing	Air Stripping and ZVI Testing					
Total	Untreated - A	Untreated - B	Untreated - C	Untreated Control - Day 0	Untreated Control - Day 21	AS Parent Mixture	ZVI Paren Mixture				
Volatiles Analysis	Result	Result	Result	Result	Result	Result	Result				
Acetone Benzene	3,220	2,400	2,350	492	309	1,410	1,770				
Bromobenzene	3,220	2,400	2,550	-	-	-	-				
Bromochloromethane							-				
Bromodichloromethane	STATE OF THE RES			MARIE A INC.			N-12-12				
Bromoform					Salari - Maria	E GLOCAL SALES	-				
Bromomethane	REPORTED IN		-		STORY - SECOND		-				
2-Butanone	Miles de Nobel	-					-				
n-Butylbenzene					•		-				
sec-Butylbenzene		-			•	•	-				
tert-Butylbenzene Carbon disulfide			-		-						
Carbon disulide Carbon tetrachloride											
Chlorobenzene	1,380	1,280	1,250	474	380	890	1,090				
Chlorodibromomethane	-	-	-	37 37 37 37 37 37	-	-	-				
Chloroethane		-	-								
2-Chloroethyl vinyl ether		-		-			-				
Chloroform	67.4	-					-				
Chloromethane	ELECTION OF THE	-	-				-				
2-Chlorotoluene		-	- 1		-	-	-				
4-Chlorotoluene	-	-	F. 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10			-	-				
2-Dibromo-3-chloropropane		-	-			-	•				
1,2-Dibromoethane Dibromomethane		•				-	-				
1,2-Dichlorobenzene	80,800	92,300	92,300	56,300	54,000	67,800	69,400				
1,3-Dichlorobenzene	-	-	-	30,300	-	-	-				
1,4-Dichlorobenzene	567	659	604	412	411	522	530				
Dichlorodifluoromethane				INC. SECTION			100 400 -				
1,1-Dichloroethane							-				
1,2-Dichloroethane	482	304	286	A THE PARTY OF		166	208				
1,1-Dichloroethene											
cis-1,2-Dichloroethene						-	-				
trans-1,2-Dichloroethene	- 20 T										
1,2-Dichloropropane			-				-				
1,3-Dichloropropane 2,2-Dichloropropane		-		-		-	•				
cis-1,3-Dichloropropene											
trans-1,3-Dichloropropene		-					-				
1,1-Dichloropropene		-					-				
Ethylbenzene	265	273	268	129		190	242				
2-Hexanone		-					-				
Hexachlorobutadiene		-				-					
Isopropylbenzene	388	397	395	135	152	148	138				
p-Isopropyltoluene		B 100 - 100				- 321	-				
4-Methyl-2-pentanone		-					-				
Methylene chloride					• =						
Naphthalene n-Propylbenzene							-				
Styrene	-										
1,1,1,2-Tetrachloroethane				V F 72 - S 15 10	2302-936739		-				
1,1,2,2-Tetrachloroethane	13,000	10,300	10,600	2,540	2,140	6,250	9,010				
Tetrachloroethene	27,000	30,600	29,000	15,300	11,900	23,200	24,000				
Toluene	1,760	1,570	1,560	474	395	1,020	1,280				
1,2,3-Trichlorobenzene				B. C. F. C. 394	Manufacture II						
1,2,4-Trichlorobenzene		-01-0									
1,1,1-Trichloroethane				BIOR CHARLES		-	-				
1,1,2-Trichloroethane	-		-				-				
Trichloroethene	3,610	3,120	3,020	826	721	2,130	2,600				
Trichlorofluoromethane		-				-	-				
1,2,3-Trichloropropane 1,2,4-Trimethylbenzene			-		•	-	-				
1,3,5-Trimethylbenzene					• 10.2		-				
Vinyl acetate	1 30453					-	-				
Vinyl chloride					-	-					
o-Xylene	161	162	137			144	161				
m, p -Xylene	924	970	955	522	460	783	842				

TABLE 2 (Revised) S/S/S Treatability Study SOIL SE0190-015: Untreated AIR STRIPPING: SAMPLING @ 10, 30, 60, 135 MINUTES Summary of Total Volatiles Analyses - EPA Method 8260B (Destined for 7.5% Portland Cement, 15% Fly Ash Treatment) Nease Chemical Site Salem, Ohio

10.1000 10.0000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.000 10.0000	AS Parent	Mixture	AS @ 10	minutes	AS @ 30	minutes	AS @ 60		AS @ 135 minutes		
Parameter	(µg/l		(µg/		(hal		(ha)		(µg/Kg)		
	0		5000001		3		6		-	135	
基础的图像是是对对	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	
Acetone		50,000		50,000		50,000		50,000	-	34,400	
Benzene	46,200	5,000	8,830	5,000	-	5,000		5,000	5,650	3,440	
Bromobenzene	-	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
Bromochloromethane	-	5,000	-	5,000		5,000		5,000		3,440	
Bromodichloromethane		5,000	-	5,000		5,000		5,000		3,440	
Bromoform		5,000	-	5,000		5,000	-	5,000	-	3,440	
Bromomethane	- 0	10,000	-	10,000		10,000	-	10,000	-	6,890	
2-Butanone	-	25,000	-	25,000		25,000		25,000	-	17,200	
n-Butylbenzene	-	5,000		5,000		5,000		5,000	-	3,440	
sec-Butylbenzene	-	5,000		5,000	-	5,000	-	5,000		3,440	
ert-Butylbenzene	-	5,000	-	5,000	-	5,000	- 1- 1	5,000	-	3,440	
Carbon disulfide	-	5,000		5,000	-	5,000	-	5,000	-	3,440	
Carbon tetrachloride	6,640	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
Chlorobenzene	31,200	5,000	12,100	5,000	9,010	5,000	- 9	5,000	-	3,440	
Chlorodibromomethane	-	5,000	-	5,000	-	5,000	-	5,000		3,440	
Chloroethane	-	10,000	10.	10,000	-	10,000	-	10,000	-	6,890	
2-Chloroethyl vinyl ether	-	20,000		20,000		20,000		20,000	-	13,800	
Chloroform		5,000		5,000		5,000		5,000	-	3,440	
Chloromethane		20,000		20,000		20,000		20,000	-	13,800	
2-Chlorotoluene		5,000	-	5,000	-:-	5,000		5,000		3,440	
			-		-			5,000	-	3,440	
-Chlorotoluene		5,000		5,000		5,000			-		
,2-Dibromo-3-chloropropane	-	20,000		20,000		20,000	-	20,000	-	13,80	
,2-Dibromoethane		5,000		5,000		5,000	-	5,000	-	3,440	
Dibromomethane	-	5,000	-	5,000		5,000	-	5,000	-	3,440	
,2-Dichlorobenzene	3,840,000	12,500	1,970,000	5,000	1,680,000	25,000	1,860,000	5,000	690,000	3,440	
1,3-Dichlorobenzene	-	5,000		5,000	-	5,000	-	5,000	-	3,440	
,4-Dichlorobenzene	30,100	5,000	15,800	5,000	15,800	5,000	13,400	5,000	5,090	3,440	
Dichlorodifluoromethane	-	10,000	-	10,000	-	10,000	-	10,000	-	6,890	
,1-Dichloroethane	-	10,000		10,000	-	10,000		10,000	-	6,890	
,2-Dichloroethane	-	5,000		5,000		5,000	-	5,000	-	3,440	
,1-Dichloroethene	-	5,000	-	5,000	-	5,000	-	5,000		3,440	
cis-1,2-Dichloroethene		5,000		5,000		5,000	-	5,000		3,440	
rans-1,2-Dichloroethene	797.	5,000		5,000		5,000	-	5,000	-	3,440	
1,2-Dichloropropane		5,000		5,000		5,000		5,000		3,440	
1,3-Dichloropropane		5,000		5,000		5,000	-	5,000		3,440	
2,2-Dichloropropane		5,000		5,000	-	5,000	-	5,000		3,440	
cis-1,3-Dichloropropene		5,000		5,000		5,000	-	5,000	-	3,440	
rans-1,3-Dichloropropene	-	5,000									
	-			5,000		5,000		5,000	-	3,440	
1,1-Dichloropropene	40.400	5,000	-	5,000		5,000	-	5,000		3,440	
Ethylbenzene	10,100	5,000	-	5,000	-	5,000	•	5,000	-	3,440	
2-Hexanone		2,500		25,000	-	25,000	-	25,000		17,20	
Hexachlorobutadiene	11,900	5,000	8,850	5,000	9,200	5,000	10,100	5,000	5,930	3,440	
sopropylbenzene	15,000	5,000	8,120	5,000	7,190	5,000	5,890	5,000	-	3,440	
o-Isopropyltoluene	-	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
4-Methyl-2-pentanone	-	2,500		25,000		25,000		25,000	-	17,20	
Methylene chloride	-	10,000	100	10,000		10,000	-	10,000	-	6,890	
Naphthalene	132,000	5,000		5,000	-	5,000	-	5,000	-	3,440	
n-Propylbenzene	-	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
Styrene		5,000		5,000		5,000		5,000		3,440	
1,1,1,2-Tetrachloroethane		5,000		5,000		5,000	-	5,000		3,440	
1,1,2,2-Tetrachloroethane	197,000	5,000	73,900	5,000	71,400	5,000	47,200	5,000	35,000	3,440	
Tetrachloroethene	977,000	5,000	427,000	5,000	324,000	5,000	181,000	5,000	85,000	3,440	
Toluene	36,400	5,000	11,800	5,000	7,390	5,000		5,000	-	3,440	
1,2,3-Trichlorobenzene	30,400	5,000	-	5,000	7,390			5,000	-		
1,2,4-Trichlorobenzene	-	5,000		5,000		5,000				3,440	
1,1,1-Trichloroethane		5,000				5,000	•	5,000		3,440	
				5,000		5,000		5,000	-	3,440	
1,1,2-Trichloroethane		5,000	24 400	5,000	- 0.000	5,000	0.500	5,000	40.700	3,440	
Trichloroethene	69,800	5,000	24,100	5,000	9,890	10,000	6,580	5,000	10,700	3,440	
Trichlorofluoromethane	-	10,000		10,000		10,000	-	10,000	-	6,890	
,2,3-Trichloropropane	-	5,000		10,000		5,000	-	10,000	-	6,890	
,2,4-Trimethylbenzene	-	5,000		5,000	-	5,000	-	5,000	-	3,440	
1,3,5-Trimethylbenzene		5,000	-	5,000		5,000		5,000	-	3,440	
/inyl acetate		10,000		10,000		10,000	- 1	10,000	-	6,890	
Vinyl chloride	-	10,000		10,000		10,000		10,000		6,890	
o-Xylene	7,990	5,000		5,000		5,000	-	5,000	-	3,440	
n, p -Xylene	39,000	5,000	15,700	5,000	12,300	5,000	6,730	5,000		3,440	
	-21000	-1000	.0,100	Percent	12,000	Percent	3,730	Percent		Perce	
	(µg/Kg)		(µg/Kg)	Removal	(µg/Kg)	Removal	(unlike)	Removal	(unité a)	Remov	
Total VOCs	5,450,330	-	2,576,200	- Tomoval	2,146,180	Removal	(µg/Kg)	Kenioval	(µg/Kg)	Kemo	
Total Percent Removal	0,100,000		2,070,200	52.7%	2,140,180	00.00	2,130,900	00.00/	837,370	61.63	
				1 34.170		60.6%		60.9%		84.69	

Note: From Draft Kemron Table 9

TABLE 3 (Revised) S/S/S Treatability Study SOIL SE0190-016: Untreated AIR STRIPPING: SAMPLING @ 10, 30, 60, 135 MINUTES Summary of Total Volatiles Analyses - EPA Method 8260B (Destined for 7.5% Portland Cement, 15% Lime Ki

The Asia Service Control of the Cont	AS Parent	Billioterma		lem, Ohio	AS @ 30	minutes	AS @ 60	minutes	AS @ 43	5 minute
	AS Parent	1001163 (G00C)	AS @ 10	HEXT LAND BURGHOOM	AS @ 30 (μg/		AS @ 60 (μg/		(μg/Kg)	
	0	354916	1		3		6			35
	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL
Acetone	-	50,000		50,000		50,000		50,000	-	21,400
Benzene	46,200	5,000	13,600	5,000		5,000	-	5,000	-	2,140
Bromobenzene	-	5,000	-	5,000	-	5,000		5,000	-	2,140
Bromochloromethane	-	5,000		5,000	-	5,000		5,000	-	2,140
Bromodichloromethane		5,000		5,000	•	5,000	-	5,000	-	2,140
Bromoform	-	5,000		5,000		5,000		5,000	-	2,140
Bromomethane		10,000		10,000		10,000		10,000		4,270
2-Butanone		25,000		25,000		25,000		25,000	-	10,700
n-Butylbenzene	-	5,000	•	5,000		5,000		5,000	-	2,140
sec-Butylbenzene	-	5,000	•	5,000		5,000	-	5,000	-	2,140
tert-Butylbenzene	-	5,000	•	5,000	•	5,000	•	5,000	-	2,140
Carbon disulfide	-	5,000	-	5,000	-	5,000		5,000	-	2,140
Carbon tetrachloride	6,640	5,000		5,000		5,000		5,000	-	2,140
Chlorobenzene	31,200	5,000	17,900	5,000	9,570	5,000		5,000	-	2,140
Chlorodibromomethane	-	5,000	-	5,000	-	5,000	-	5,000	-	2,140
Chloroethane	-	10,000		10,000	-	10,000	-	10,000	-	4,270
2-Chloroethyl vinyl ether		20,000	-	20,000		20,000		20,000	-	8,550
Chloroform	-	5,000		5,000	-	5,000	•	5,000	-	2,140
Chloromethane	-	20,000		20,000		20,000	• 100	20,000	-	8,550
2-Chlorotoluene		5,000	•	5,000	-	5,000	-	5,000	-	2,140
4-Chlorotoluene	-	5,000		5,000		5,000	-	5,000	-	2,140
1,2-Dibromo-3-chloropropane	-	20,000		20,000	-	20,000	•	20,000	-	8,550
1,2-Dibromoethane	-	5,000		5,000		5,000	-	5,000	-	2,140
Dibromomethane	2 0 10 000	5,000	2 400 000	5,000	0.700.000	5,000	4 740 000	5,000	F44.000	2,140
1,2-Dichlorobenzene	3,840,000		3,490,000	25,000	2,700,000	25,000	1,740,000	5,000	544,000	2,140
1,3-Dichlorobenzene	-	5,000	- 00 400	5,000	47700	5,000	40.000	5,000		2,140
1,4-Dichlorobenzene	30,100	5,000	22,100	5,000	17,700	5,000	12,300	5,000	3,500	2,140
Dichlorodifluoromethane	•	10,000		10,000		10,000	•	10,000		4,270
1,1-Dichloroethane	-	10,000	•	10,000		10,000		10,000	-	4,270
1,2-Dichloroethane	-	5,000		5,000	-	5,000	-	5,000	-	2,140
1,1-Dichloroethene		5,000		5,000	-	5,000		5,000	-	2,140
cis-1,2-Dichloroethene	•	5,000		5,000	-	5,000	-	5,000	-	2,140
trans-1,2-Dichloroethene	-	5,000		5,000		5,000	•	5,000	-	2,140
1,2-Dichloropropane		5,000		5,000		5,000		5,000		2,140
1,3-Dichloropropane	-	5,000		5,000		5,000		5,000		2,140
2,2-Dichloropropane		5,000	-	5,000		5,000		5,000	-	2,140
cis-1,3-Dichloropropene		5,000	-	5,000		5,000	-	5,000	-	2,140
trans-1,3-Dichloropropene	-	5,000		5,000		5,000		5,000	-	2,140
1,1-Dichloropropene	40.400	5,000		5,000	-	5,000		5,000		2,140
Ethylbenzene 2-Hexanone	10,100	5,000	5,090	5,000		5,000		5,000		2,140
	44.000	2,500	40.500	25,000	40.000	25,000	- 0.000	25,000		10,700
Hexachlorobutadiene	11,900	5,000	10,500	5,000	10,600	5,000	9,030	5,000	5,570	2,140
Isopropylbenzene	15,000	5,000	9,390	5,000	7,340	5,000	5,280	5,000	-	2,140
p-Isopropyltoluene	-	5,000		5,000		5,000	•	5,000		2,140
4-Methyl-2-pentanone	-	2,500		25,000		25,000	-	25,000		10,700
Methylene chloride	122,000	10,000	•	10,000	-	10,000	•	10,000	-	4,270
Naphthalene	132,000	5,000	-	5,000		5,000	-	5,000	-	2,140
n-Propylbenzene Styrene		5,000	-	5,000	-	5,000	-	5,000	-	2,140
1,1,1,2-Tetrachloroethane		5,000				5,000		5,000		2,140
1,1,2-Tetrachloroethane	197,000	5,000	133,000	5,000	97 900	5,000	43 200	5,000	15 200	2,140
Tetrachloroethene	977,000	5,000	590,000	5,000	87,800 330,000	5,000	43,200 135,000	5,000	15,300	2,140
Toluene	36,400	5,000	17,300		7,220	5,000		5,000		2,140
1,2,3-Trichlorobenzene	36,400	5,000	17,300	5,000		5,000	-	5,000	-	2,140
1,2,4-Trichlorobenzene		5,000	-	5,000	-	5,000	-	5,000	-	2,140
1,1,1-Trichloroethane	-	5,000		5,000	-	5,000	-	5,000	-	2,140 2,140
1,1,2-Trichloroethane	-	5,000	-	5,000		5,000	-	5,000		2,140
Trichloroethene	69,800	5,000	25,700	5,000	10,600	5,000	-	5,000	3,410	2,140
Trichlorofluoromethane	-	10,000	-	10,000	-	10,000	-	10,000	3,410	4,270
1,2,3-Trichloropropane		5,000		10,000		10,000		10,000		4,270
1,2,4-Trimethylbenzene	-	5,000		5,000		5,000	-	5,000		2,140
1,3,5-Trimethylbenzene		5,000	-	5,000	-	5,000	-	5,000		2,140
Vinyl acetate	-	10,000		10,000	-	10,000		10,000		
Vinyl chloride		10,000		10,000		10,000	-			4,270
o-Xylene	7,990	5,000	-	5,000	-	5,000	-	10,000 5,000		4,270
m, p -Xylene	39,000	5,000	21,300	5,000	12,700	5,000			-	2,140
in p Agiono	00,000	0,000	21,000	Percent	12,700	Percent	5,370	5,000 Percent		2,140 Percen
	(µg/Kg)	STEE	(µg/Kg)	Removal	(µg/Kg)	Removal	(um/Mm)	The second second	(maller)	
Total VOCs	5,450,330		4,355,880	Kemoval	3,193,530		(µg/Kg) 1,950,180	Removal	(µg/Kg) 604,780	Remova
Total Percent Removal	0,400,000		7,000,000	20.1%	0,100,000	41.4%	1,550,180	64.2%	004,700	88.9%

Note: From Draft Kemron Table 10

Table 4 (Revised) S/S/S Treatability Study

Phase III VOC Confirmation Testing Results Summary of Total Volatiles Analyses - EPA Method 8260B Nease Chemical Site

Salem, Ohio

			AIR S	TRIPP	NG: 21 Da	y Cure		de la constitución de la constit			ZERO VA	LENT	IRON: 21 E			
	Air Strip	ping ¹	Ceme	ent & F	lyash ²	Cement &	Lime I	Kiln Dust ²	Zero Valer	nt Iron1	Ceme	ent & F	lyash ²	Cement	& Lime F	Kiln Dust ²
	Contr		0190-1	5 AS	Percent	0190-01	6 AS	Percent	Contr	ol	0190-01	7 ZVI	Percent			Percent
TOTAL	(µg/K	g)	(µg/K	g)	Removal	(µg/K	(g)	Removal	(µg/K	g)	(μg/K	g)	Removal	(µg/	Kg)	Removal
VOLATILES	Result	DL	Result	DL	%	Result	DL	%	Result	DL	Result	DL	%	Result	DL	%
		201														
Acetone	25,000	50,000	1,260	2,520	95%	690	1,380	97%	16,500	33,000	2,510	5,020	85%	1,470	2,940	91%
Benzene	46,200	5,000	497	252	99%	311	138	99%	31,500	3,300	251	502	99%	147	294	100%
Bromobenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Bromochloromethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Bromodichloromethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Bromoform	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Bromomethane	5,000	10,000	252	504	95%	138	276	97%	3,300	6,600	500	1,000	85%	294	587	91%
2-Butanone	12,500	25,000	630	1,260	95%	345	690	97%	8,250	16,500	1,255	2,510	85%	735	1,470	91%
n-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
sec-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
tert-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Carbon disulfide	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Carbon tetrachloride	6,640	5,000	126	252	98%	69	138	99%	4,370	3,300	251	502	94%	147	294	97%
Chlorobenzene	31,200	5,000	287	252	99%	183	138		20,400	3,300	251	502	99%	147	294	99%
Chlorodibromomethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
Chloroethane	5,000	10,000	252	504	95%	138	276		3,300	6,600	500	1,000	85%	294	587	91%
2-Chloroethyl vinyl ether	10,000	20,000	505	1,010	95%	276	552	97%	6,600	13,200	1,005	2,010	85%	585	1,170	91%
Chloroform	2,500	5,000	126	252	95%	69	138		1,650	3,300	251	502	85%	147	294	91%
Chloromethane	10,000	20,000	505	1,010		276	552	97%	6,600	13,200	1,005	2,010		585	1,170	91%
	2,500	5,000	126	252	95%	69	138		1,650	3,300	251	502	85%	147	294	91%
2-Chlorotoluene													85%	147	294	91%
4-Chlorotoluene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502				
1,2-Dibromo-3-chloropropane	10,000	20,000	505	1,010		276	552	97%	6,600	13,200	1,005	2,010		585	1,170	91% 91%
1,2-Dibromoethane	2,500	5,000	126	252		69	138		1,650	3,300	251	502		147	294	
Dibromomethane	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
1,2-Dichlorobenzene	3,840,000	12,500	75,800	252		48,700	138		2,690,000	8,250	114,000	502	96%	56,500	294	98%
1,3-Dichlorobenzene	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
1,4-Dichlorobenzene	30,100	5,000	612	252		374	138		19,500		934	502		432	294	98%
Dichlorodifluoromethane	5,000	10,000	252	504		138	276		3,300	6,600	500	1,000		294	587	91%
1,1-Dichloroethane	5,000	10,000	252	504		138	276		3,300	6,600	500	1,000	85%	294	587	91%
1,2-Dichloroethane	2,500	5,000	126	252	95%	139	138	94%	1,650	3,300	251	502	85%	147	294	91%
1,1-Dichloroethene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
cis-1,2-Dichloroethene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
trans-1,2-Dichloroethene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
1,2-Dichloropropane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
1,3-Dichloropropane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
2,2-Dichloropropane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%
cis-1,3-Dichloropropene	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
trans-1,3-Dichloropropene	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
1,1-Dichloropropene	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
Ethylbenzene	10,100	5,000	126	252		69	138		6,250		251	502		147	294	98%
2-Hexanone	1,250	2,500	630	1,260		345	690		8,250	16,500	1,255	2.510		735	1,470	91%
Hexachlorobutadiene	11,900	5,000	1,160	252		1,220	138		7,940		930	502		769	294	90%
Isopropylbenzene	15,000	5,000	1,100	252		69	138		9,310		251	502	97%	147	294	98%
p-Isopropyltoluene	2,500	5,000	126	252		69	138		1,650	3,300	251	502	85%	147	294	91%
4-Methyl-2-pentanone	1,250	2,500	630	1,260		345	690		8,250	16,500	1,255	2,510		735	1,470	91%
Methylene chloride	5,000	10,000	252	504		138	276		3,300	6,600	1,255	1,000		735 294		91%
Naphthalene	132,000		126	252			138								587	
						69			5,520		251	502		147	294	97%
n-Propylbenzene	2,500	5,000	126	252		69	138		1,650	3,300	251	502		147	294	91%
Styrene	2,500	5,000	126	252		151	138		1,650	3,300	251	502		147	294	91%
1,1,1,2-Tetrachloroethane	2,500	5,000	126	252		69	138		1,650	3,300	251	502		147	294	91%
1,1,2,2-Tetrachloroethane	197,000			252		69	138		126,000		251	502		147	294	100%
Tetrachloroethene	977,000			252		6,230	138		648,000		16,800			6,140	294	99%
Toluene	36,400		291	252		159	138		23,700		251	502		147	294	99%
1,2,3-Trichlorobenzene	2,500			252		69			1,650					147	294	
1,2,4-Trichlorobenzene	2,500			252		172			1,650					147	294	
1,1,1-Trichloroethane	2,500			252		69			1,650					147	294	
1,1,2-Trichloroethane	2,500	5,000		252		69	138		1,650			502		147	294	
Trichloroethene	69,800					1,690			49,600					1,330	294	97%
Trichlorofluoromethane	5,000			504		138	276		3,300				85%	294	587	91%
1,2,3-Trichloropropane	2,500			504		138	276	94%	3,300	6,600	500	1,000	85%	294	587	91%
1,2,4-Trimethylbenzene	2,500			252		69	138		1,650			502		147	294	
1,3,5-Trimethylbenzene	2,500	5,000		252	95%	69	138	97%	1,650			502		147	294	
Vinyl acetate	5,000	10,000	252	504	95%	138	276		3,300					294	587	91%
Vinyl chloride	5,000			504		138	276		3,300					294	587	91%
o-Xylene	7,990			252		69	138		4,750			502		147	294	
m, p -Xylene	39,000			252		145			24,500					147		
											018	002	3070	14/	294	3970
	5,650,330		105,002		98%	65,891	14,490	99%	3,819,840		160,167	1	97%	79,858	30,843	99%

Notes:

Notes:

Air Stripping Control laboratory results from draft Kemron Table 8.

Cement & Flyash and Cement & Lime Kiln Dust laboratory results from draft Kemron Table 13.

Red results denote non-detects that are listed as 1/2 the reporting limit (i.e., 126)

Table 4a (Revised) S/S/S Treatability Study Phase III SPLP Confirmation Testing Results Summary of SPLP Analyses - EPA Method 1312/8260B

Nease Chemical Site Salem, Ohio

							Salem, Or	110								
			Al	R STRIPPI	NG: 21 Day						ZERO V	ALENT IR	ON: 21 Day			
	Air Stripp	oing ¹	Cen	nent & Fly	ash ²	Cement	& Lime Ki	In Dust ²	Zero Valen	t Iron ¹	Cen	nent & Flya	ash ²	Cement &	Kiln Dust	
	Contro	ol	0190-	15 AS	Percent	0190-0	16 AS	Percent	Contr	ol	0190-0	17 ZVI	Percent	0190-018		Percen
SPLP	(µg/Kg	3)	(µg/	Kg)	Removal		Kg)	Removal	(µg/K		(µg/		Removal	(µg/K		Remova
VOLATILES	Result	DL	Result	DL	%	Result	DL	%	Result	DL	Result	DL	%	Result	DL	%
A t	605	1 250	120	105	79%	25	50	96%	625	1,250	250	500	60%	250	500	60%
Acetone	625	1,250	130	125 6.3		8.61	2.5	99%	1,770	62.5	13	25		13	25	99%
Benzene	1,410	62.5	3	6.3		0.01	2.5	96%	31	62.5	13	25	60%	13	25	60%
Bromobenzene	31 50	62.5 100	5	10		2	4	96%	50	100	20	40	60%	20	40	60%
Bromochloromethane Bromodichloromethane	63	125	6	12.5		3	5	96%	63	125	25	50	60%	25	50	
Bromoform	125	250	13	25		5	10		125	250	50	100	60%	50	100	60%
Bromomethane	125	250	13	25		5	10		125	250	50	100	60%	50	100	60%
2-Butanone	625	1,250	63	125		25	50		625	1,250	250	500	60%	250	500	60%
n-Butylbenzene	63	125	6	12.5		3	5		63	125	25	50	-	25	50	
sec-Butylbenzene	63	125	6	12.5		3	5		63	125	25	50		25	50	60%
ert-Butylbenzene	63	125	6	12.5		3	5	96%	63	125	25	50	60%	25	50	60%
Carbon disulfide	125	250	13	25		5	10	96%	125	250	50	100	60%	50	100	60%
Carbon tetrachloride	63	125	6	12.5		3	5	96%	63	125	25	50	60%	25	50	60%
Chlorobenzene	890	62.5	3	6.3	100%	6.57	2.5	99%	1,090	62.5	62.1	25	94%	46.8	25	96%
Chlorodibromomethane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
Chloroethane	125	250	13	25	90%	5	10	96%	125	250	50	100	60%	50	100	
2-Chloroethyl vinyl ether	2,500	5,000	250	500		100	200		2,500	5,000	1,000	2000		1,000		
Chloroform	31	62.5	3	6.3		1	2.5		31	62.5	13	25		13	25	
Chloromethane	63	125	6	12.5		3	5		63	125	25	50		25		
2-Chlorotoluene	31	62.5	3	6.3		1	2.5		31	62.5	13	25		13	25	
4-Chlorotoluene	63	125	6	12.5		3	5		63	125	25	50		25	50	
1,2-Dibromo-3-chloropropane	250	500	25	50		10	20		250	500	100	200		100		
1,2-Dibromoethane	63	125	6	12.5		3	5		63	125		50		25		
Dibromomethane	63	125	6	12.5		3	5		63	125		50		25	50	
1,2-Dichlorobenzene	67,800	62.5	4,090	6.3		3,360	2.5		69,400		30,400	25		33,900		
1,3-Dichlorobenzene	63	125	6	12.5		3	5		63	125	25	50		25	50	
1,4-Dichlorobenzene	522	62.5	20.7	6.3		19.3	2.5		530			25		230		
Dichlorodifluoromethane	63	125	6	12.5		3	5		63	125		50		25		
1,1-Dichloroethane	31	62.5	3	6.3		5.07	2.5		208	62.5		25 50		13		
1,2-Dichloroethane 1,1-Dichloroethene	166	125 250	6	12.5		5.07	10		125	125 250	25	100		25 50		
cis-1,2-Dichloroethene	125 63	125	13	12.5		3	5		63	125		50		25		
trans-1,2-Dichloroethene	63	125	6	12.5		3	5		63	125	25	50		25		
1,2-Dichloropropane	50	100	5	12.5		2	4		50			40		20		
1,3-Dichloropropane	50	100	5	10		2	4		50			40		20		
2,2-Dichloropropane	63	125	6	12.5		3	5		63	125		50		25	50	
cis-1,3-Dichloropropene	63	125	6	12.5		3	5		63	125		50		25		
trans-1,3-Dichloropropene	125	250	13	25		5	10		125	250	50	100		50		
1,1-Dichloropropene	63	125	6	12.5		3	5		63	125		50		25		
Ethylbenzene	190	125	6	12.5		3	5	99%	242			50	90%	25		
2-Hexanone	625	1,250	63	125	90%	25	50	96%	625	1,250	250	500	60%	250	500	60%
Hexachlorobutadiene	63	125	6	12.5	90%	14.5	5	77%	63	125	25	50	60%	25	50	60%
Isopropylbenzene	148	125	6	12.5		3	5	98%	138	125	56.4	50		59.3		
p-Isopropyltoluene	63	125	6	12.5		3	5		63	125		50		25		
4-Methyl-2-pentanone	625	1,250	63	125		25	50		625	1,250		500		250	500	
Methylene chloride	63	125	6	12.5		3	5		63	125		50		25	50	
Naphthalene	50	100	5	10		5.42	4		50			40		20		
n-Propylbenzene	31	62.5	3	6.3		1	2.5		31	62.5	13	25		13		
Styrene	31	62.5	3	6.3		1	2.5		31	62.5				13		
1,1,1,2-Tetrachloroethane	63	125	6	12.5		3	5		63	125		50		25		
1,1,2,2-Tetrachloroethane	6,250	62.5	3	6.3		1	2.5		9,010			25		13		
Tetrachloroethene	23,200	125	74.9			128			24,000			50		1,700		
Toluene	1,020	125	6	12.5		5.45	5		1,280			50		25	50	
1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	31	62.5 100	3	6.3		7.00	2.5		50	62.5				13		
1,1,1-Trichloroethane	63	100	5	12.5		7.96	5	84%		100	20	40		20	40	
1,1,2-Trichloroethane	63	125	6	12.5		3	5		63	125 125				25		
Trichloroethene	2,130					40.8			2,600			50		25		
Trichlorofluoromethane	63	125	19.0	12.5		3	5		63					25		
1,2,3-Trichloropropane	125	250	13	25		5	10		125					50		
1,2,4-Trimethylbenzene	63	125	6			3	5		63					25		
1,3,5-Trimethylbenzene	63	125	6			3	5		63					25		
Vinyl acetate	625	1,250	63			25			625					250		
Vinyl chloride	63	125	6			3	5		63					25		
			6	12.5		2										
o-Xylene	144	125	0	12.5	30 70	3	5	98%	161	125	25	50	04%	25) OU	
o-Xylene m, p -Xylene	783			12.5		3	5		842					109		

Notes:

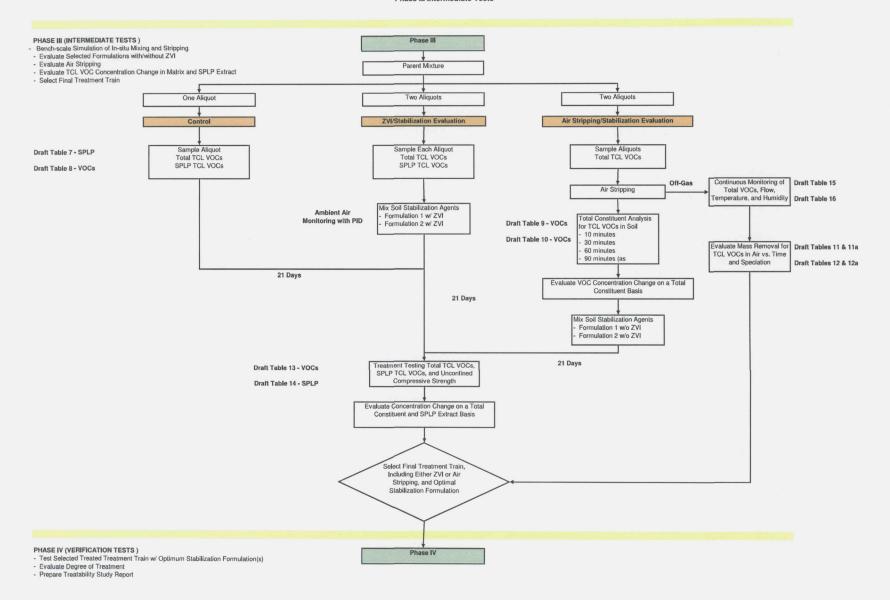
Notes:

1 Air Stripping Control laboratory results from draft Kemron Table 7.

2 Cement & Flyash and Cement & Lime Kiln Dust laboratory results from draft Kemron Table 14.

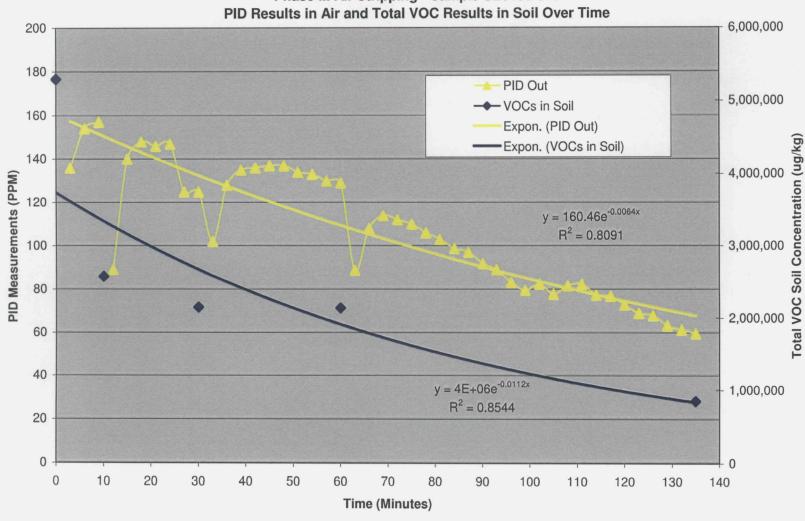
3 Red results denote non-detects that are listed as 1/2 the reporting limit (i.e., 126)

Figure 1 (Revised) Rutgers-Salem S/S/S Treatability Study Phase III Intermediate Tests



Note:
Draft Tables are from forthcoming treatability study report.

Figure 2
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-015
ID Results in Air and Total VOC Results in Soil Over Time

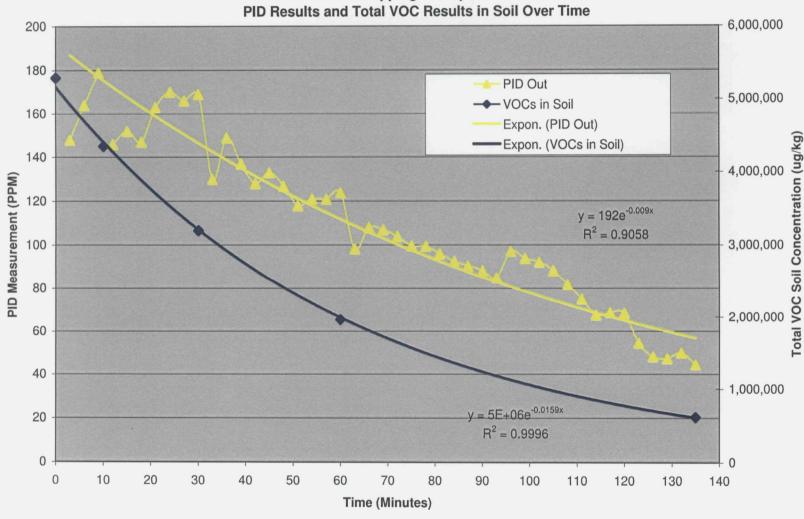


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Figure 3

Nease Chemical Site - S/S/S Treatability Study

Phase III Air Stripping - Sample SE0190-016

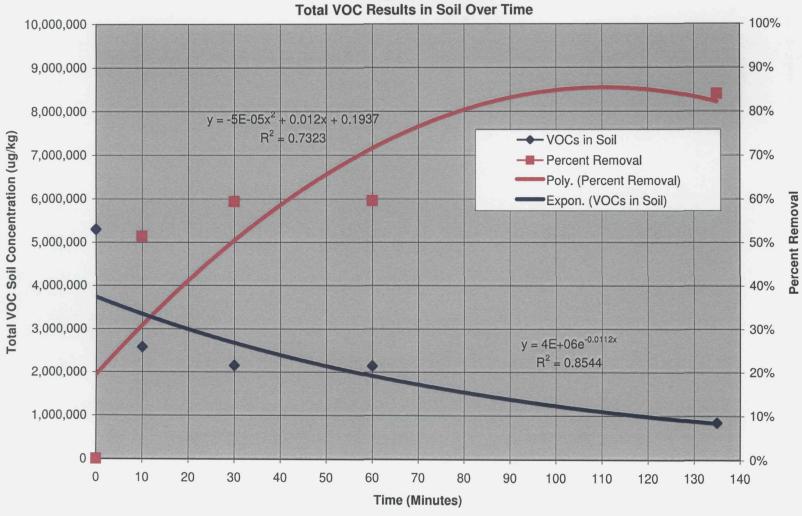


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Figure 4

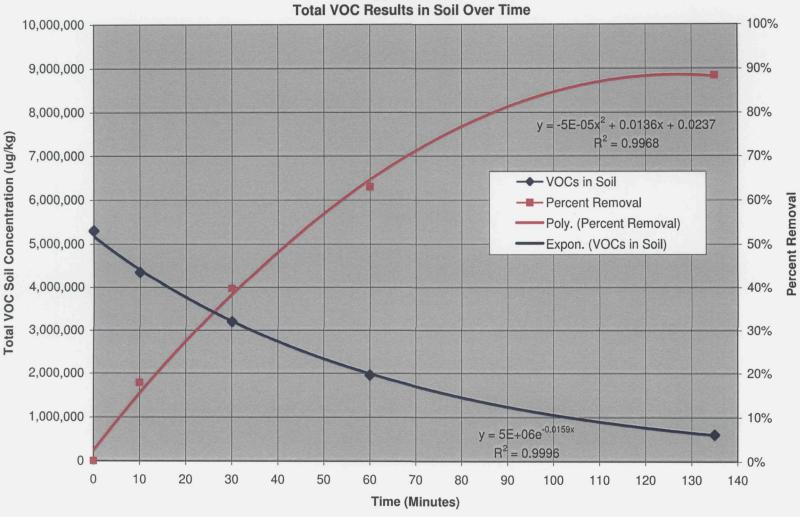
Nease Chemical Site - S/S/S Treatability Study

Phase III Air Stripping - Sample SE0190-015



Golder Associates

Figure 5
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-016



Golder Associates

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TRANSMITTAL LETTER

To:	Mary Logan USEPA (SR-6J)	Date: July 12, 200					
	77 West Jackson Blvd. Chicago, IL 60604	Project No.: 933-6154					
Sent	by:						
[] Mail	[] Under Separate Cover					
[] Courier	[X] Federal Express					
[] Hand Carried	[] Enclosed					

Quantity	Item	Description
1	Сору	S/S/S Treatability Study Phase III Results, RUTGERS Organics Corporation, Nease Chemical Site, Salem, Ohio
Remarks:	<u> </u>	

cc: Luanne Vanderpool, 1 copy
Sheila Abraham, 1 copy
Tim Christman, 1 copy
Kevin Palombo. 1 copy

Per: Allen Kane/Steve Finn



TECHNICAL MEMORANDUM

TO: Mary Logan, USEPA DATE: July 12, 2007

FR: Joe Gormley, Randy White, Steve Finn OUR REF: 933-6154

RE: STRIPPING/STABILIZATION/SOLIDIFICATION (S/S/S) TREATABILITY STUDY PHASE III RESULTS, NEASE CHEMICAL SITE, SALEM, OHIO (REVISED)

The purpose of this memorandum is to provide a status update of the Stripping/Stabilization/Solidification (S/S/S) Treatability Study, including the Phase III results, and to propose the treatment method and reagent formulation for USEPA/Ohio EPA approval before proceeding with the final phase (IV) of the Study.

1.0 SCOPE/OBJECTIVES

The scope of the Treatability Study is described in the Pre-Design Investigation Work Plan (PDI Work Plan; Golder Associates, September 2006). The overall objective of the S/S/S technology is to reduce the chemical leachability of the treated volume to mitigate future releases of chemicals to groundwater from former Ponds 1 and 2. The primary objective of the S/S/S Treatability Study is to determine the most appropriate methods and admixtures for full-scale operation that will result in adequate strength (to support the construction of a geosynthetic cap) and substantial reduction of chemical leachability.

The treatability testing is being conducted in four phases:

- Phase I Field Sampling and Baseline Characterization;
- Phase II Screening Tests;
- Phase III Intermediate Tests; and
- Phase IV Verification Tests.

During Phase I, Golder Associates identified an area in former Pond 2 that exhibited elevated chemical impacts and, with USEPA/Ohio EPA approval, collected samples from this location for use in the S/S/S treatability study. After receiving the samples, the laboratory homogenized the material to create a "parent mixture" while seeking to minimize loss of volatiles and performed baseline physical, chemical, and leachability (SPLP) testing to define the characteristics of the untreated material and to confirm that it represented the material observed in the field.

In Phase II, the parent mixture was treated with 10 different stabilization/ solidification (S/S) admixture formulations to determine the strength properties of the mixtures. Based on these test results, and with the approval of the USEPA/Ohio EPA, the following two admixtures were selected for further evaluation:

- 7.5% Portland Cement / 15% Class "C" Flyash; and
- 7.5% Portland Cement / 15% Lime Kiln Dust

2.0 PHASE III TESTING

Phase III - Intermediate Testing was designed to determine the benefits of in-situ air stripping of the soils prior to solidification/stabilization (S/S), as well as the potential benefits of zero-valent iron (ZVI) amendments to the formulations selected in Phase II. As defined in the PDI Work Plan, the primary goals of Phase III were the following:

- to compare the treatment benefits of air stripping versus ZVI addition;
- to evaluate total constituent and SPLP concentration reduction achieved by the selected S/S formulations; and
- to ultimately select the final treatment approach for verification testing in Phase IV.

The steps of Phase III testing are shown in Figure 1 and described below.

2.1 Air Stripping Evaluation

A portion of the initial parent mixture was selected for the air stripping evaluation and submitted for total constituent and SPLP analysis of TCL VOCs. The results for these analyses were comparable to the results for the initial analyses of the parent material (see Tables 1 and 1a).

Two aliquots (SE0190-015 and SE0190-016) were then subjected to a bench-scale simulation of in-situ air stripping. To simulate air stripping, the soils were mixed using a Hobart mixer in a sealed glove box and maintained at approximately 55°F. Flow rate, temperature, and humidity of the influent and effluent air were continuously recorded. VOCs emitted during the mixing were carried by the sweep gas out of the glove box to an absorbent carbon cartridge. A sampling tee upstream from the carbon was used to continuously monitor total VOC concentrations of the sweep gas with a PID. Figures 2 and 3 show the PID concentrations over time for the two aliquots. Excel® was used to apply trendlines to the data shown on the figures. The sudden drops in PID readings are associated with sampling episodes as described below.

Samples from the treated soils were collected at elapsed times of approximately 10, 30, and 60 minutes after the start of mixing/air stripping and analyzed for total constituent concentrations of TCL VOCs. The soil sample analyses results are summarized in Tables 2 and 3 and Figures 2 and 3 show the soil concentrations in relation to the PID readings. Applying trendlines with best fit to these figures shows that the soil concentration (as well as PID results) appear to be decreasing exponentially. Figures 4 and 5 plot the decrease in soil concentration along with the percent removal. From these figures it can be seen that greater than 80 percent of total VOCs were removed from the material in approximately 90 minutes.

2.2 ZVI Evaluation

A portion of the initial parent mixture was selected for the ZVI evaluation and analyzed for TCL VOCs on a total constituent concentration basis, as well as in SPLP extracts. The results were comparable to those for the initial analysis of the parent material (see Tables 1 and 1a). Two aliquots of the ZVI parent mixture (SE0190-017 and SE0190-018) were then treated with the addition of granular (40 μ m-1,200 μ m) ZVI. The ZVI was added to the samples in amounts corresponding to approximately five times the stoichiometric amount estimated for treatment of all VOCs and SVOCs (as determined in "parent" baseline sampling).

2.3 Control Samples

A control sample was taken from the parent material at the beginning of Phase III testing (Untreated Control - Day 0). The total VOC and SPLP results for this control sample are shown in Tables 1 and 1a and indicate lower levels of contaminants then any of the treatment samples. The untreated control sample was then placed in a zip lock bag and stored at room temperature for 21 days. After 21 days a sample was collected (Untreated Control - Day 21) and submitted for total constituent and SPLP analysis of TCL VOCs (refer to Tables 1 and 1a). The untreated control sample results for the 21 day sample show significant decreases in total VOCs and a lesser decrease in SPLP VOCs over the same time period. These changes may be related to volatilization, heterogeneity of the material, or sampling procedures.

2.4 Formulation Evaluation

Following air stripping and ZVI addition, the stripped samples (SE0190-015 and SE0190-016) and the two ZVI treated samples (SE0190-017 and SE0190-018) were mixed with the selected stabilization agents (7.5% Portland Cement/15% Class C Fly Ash and 7.5% Portland Cement/15% Lime Kiln dust) and allowed to cure for 21 days. After 21 days, the samples were analyzed for concentrations of TCL VOCs on a total constituent concentration basis and in the SPLP extract. The results for these analyses along with percent removals are summarized on Tables 4 and 4a.

3.0 CONCLUSIONS/NEXT STEPS

3.1 Conclusions

The results of Phase III testing demonstrate the following:

- The optimum duration for air stripping was 90 minutes.
- Both the air stripping and ZVI treatment trains provided significant percent reductions in total VOCs; however, the air stripping treatment train provided significantly greater percent reductions in leachability compared to the ZVI treatment;
- The Cement/Class C Fly Ash and the Cement/Lime Kiln Dust formulations provided similar percent reductions in total VOCs and leachable VOCs; and
- Air stripping along with either the Cement/Fly Ash or the Cement/Lime Kiln Dust formulation appears to provide the best treatment and stabilization formulation for meeting the goal of mitigating future release of chemicals to groundwater from former Ponds 1 and 2.
- Prior to the next phase, the parent material proposed for Phase IV testing should be tested for total VOC analysis on a fast turn-around basis to verify that a representative sample of the site material is being treated.

3.2 Next Steps

Subject to USEPA/Ohio EPA approval, Golder Associates proposes to perform Phase IV verification testing on two samples in the following manner:

- Perform rapid-turn-around TCL VOC analysis of both samples to verify that the testing will be performed on representative material;
- Perform total TCL semi-VOC, SPLP TCL VOCs, and SPLP TCL semi-VOC analyses to define the baseline condition;
- Perform air stripping on one sample for 90 minutes and on the other sample for 135 minutes;
- Stabilize both samples with 7.5% Portland Cement and 15% Class C Fly Ash*;
- Allow both samples to cure for 21 days;
- Perform Total and SPLP VOC and SVOC analyses on both samples; and
- Perform strength testing on both samples.

^{*} Note: Fly ash is significantly less expensive than lime kiln dust (\$25 per ton versus \$41 per ton for 35, 000 tons) and appears to afford the same level of treatment.

Table 1 S/S/S Treatability Study

Phase III Testing Results - Comparison of Control Sample and Parent Mixture Testing Results Summary of Total Volatiles Analyses - EPA Method 8260B

Nease Chemical Site Salem, Ohio

Besulte (ug/Vg)	Untreated	d Material Charac	terization	Contr	ol Testing	Air Stripping and ZVI Testing			
Results (μg/Kg)	Ontreated	a material orial ac	terization	Untreated Control	THE RESERVE AND ASSESSED TO SERVE AND ASSESSED.	AS Parent	ZVI Paren		
Total	Untreated - A	Untreated - B	Untreated - C	Day 0	Day 21	Mixture	Mixture		
Volatiles Analysis	Result	Result	Result	Result	Result	Result	Result		
Acetone	San Charles					-	-		
Benzene	51,400	43,900	48,500	3,600	961	46,200	31,500		
Bromobenzene		•	•		-	-	-		
Bromochloromethane Bromodichloromethane	-								
Bromoform							-		
Bromomethane		THE RESERVE		1000					
2-Butanone						- 1	-		
n-Butylbenzene			•			-			
sec-Butylbenzene		-							
tert-Butylbenzene						-	-		
Carbon disulfide			- /	100		- 0.040	4 070		
Carbon tetrachloride	20.200	- 20,000	20.500	2.010		6,640 31,200	4,370 20,400		
Chlorobenzene Chlorodibromomethane	30,300	29,000	29,500	3,910		31,200	20,400		
Chloroethane						1			
2-Chloroethyl vinyl ether		-		- A - A - A - A - A - A - A - A - A - A		-			
Chloroform		-	D. C. S. C. C. C.			-			
Chloromethane		-	191 - 798				-		
2-Chlorotoluene						-	-		
4-Chlorotoluene		/ -		20/2/9-		FIRST PROPERTY.			
2-Dibromo-3-chloropropane		-	10 / / / / / / / / / / / / /				-		
1,2-Dibromoethane		-	- 7	-		-	DAY COLD - 1		
Dibromomethane 1.2-Dichlorobenzene	3,880,000	3,410,000	3,330,000	892,000	231,000	3,840,000	2,690,00		
1,3-Dichlorobenzene	3,880,000	3,410,000	3,330,000	892,000	231,000	3,040,000	2,090,000		
1.4-Dichlorobenzene	29,600	27,500	26,500	6,840	1,580	30,100	19,500		
Dichlorodifluoromethane	-	-	-	-	-	-	-		
1,1-Dichloroethane							-		
1,2-Dichloroethane			- 110			-			
1,1-Dichloroethene	CHO SECUL								
cis-1,2-Dichloroethene		TO COMPANY	-						
trans-1,2-Dichloroethene						E. Contract			
1,2-Dichloropropane		-	- 1				-		
1,3-Dichloropropane									
2,2-Dichloropropane cis-1,3-Dichloropropene		-	-	-		-			
trans-1,3-Dichloropropene			-			-			
1,1-Dichloropropene	-	-							
Ethylbenzene						10,100	6,250		
2-Hexanone			- 1						
Hexachlorobutadiene	7.5		18,600	6,430	1,250	11,900	7,940		
Isopropylbenzene	PART OF STREET	Table NR P		3,650		15,000	9,310		
p-Isopropyltoluene		N. 1936	-	-					
4-Methylene chloride	A SAME LA		-		-	-	-		
Methylene chloride Naphthalene					1	132,000	5,520		
n-Propylbenzene		-	-			132,000	5,520		
Styrene									
1,1,1,2-Tetrachloroethane		A. 192 (0-10.0)	100			- /			
1,1,2,2-Tetrachloroethane	241,000	202,000	192,000	22,600	10,100	197,000	126,000		
Tetrachloroethene	966,000	874,000	888,000	161,000	18,700	977,000	648,000		
Toluene	35,900	31,400	33,400	3,710		36,400	23,700		
1,2,3-Trichlorobenzene						-			
1,2,4-Trichlorobenzene	•	Left. 33-118.57	-			-			
1,1,1-Trichloroethane		-	-	-	•				
Trichloroethene	73,600	59,900	63,600	7,670	1,870	69,800	49,600		
Trichlorofluoromethane	73,000	- 39,900	-	7,670	1,070	-	49,600		
1,2,3-Trichloropropane	-				- W				
1,2,4-Trimethylbenzene	70.00		-				-		
1,3,5-Trimethylbenzene		Contract of the							
Vinyl acetate	WE		Eval-use				-		
Vinyl chloride			Bullet - ROTE			400000000000000000000000000000000000000			
o-Xylene					BELL -	7,990	4,750		
m, p -Xylene	30,200	26,300	29,700	5,900		39,000	24,500		

Table 1a

S/S/S Treatability Study

Phase III Testing Results - Comparison of Control Sample and Parent Mixture Testing Results Summary of SPLP Analyses - EPA Method 1312/8260B Nease Chemical Site

Salem. Ohio

	Salem, Ohio										
Results (μg/L)	Untreated	d Material Charac	terization	Hart Called A. B. Called	Testing	Air Stripping and ZVI Testin					
Total	Untreated - A	Untreated - B	Untreated - C	Untreated Control - Day 0	Untreated Control - Day 21	AS Parent Mixture	ZVI Paren Mixture				
Volatiles Analysis	Result	Result	Result	Result	Result	Result	Result				
Acetone Benzene	3,220	2,400	2,350	492	309	1,410	1,770				
Bromobenzene	3,220	2,400	2,330	432	-	1,410	-				
Bromochloromethane											
Bromodichloromethane		ever - warm		THE RESIDENCE		RELEASE MEDICAL					
Bromoform											
Bromomethane				3000 - CO.		-	-				
2-Butanone					•	-					
n-Butylbenzene		-					-				
sec-Butylbenzene	-				-	-					
tert-Butylbenzene Carbon disulfide											
Carbon tetrachloride											
Chlorobenzene	1,380	1,280	1,250	474	380	890	1,090				
Chlorodibromomethane	-		-			- NO. 3 - NO. 1					
Chloroethane				THE REAL PROPERTY.	DESCRIPTION AND		-				
2-Chloroethyl vinyl ether		-		DESTRUCTION NAMED							
Chloroform	67.4						-				
Chloromethane		- V-									
2-Chlorotoluene		-				•	-				
4-Chlorotoluene						•					
2-Dibromo-3-chloropropane 1,2-Dibromoethane	- 1										
Dibromomethane						-					
1,2-Dichlorobenzene	80,800	92,300	92,300	56,300	54,000	67,800	69,400				
1,3-Dichlorobenzene	-	-	-	-	-	-	-				
1,4-Dichlorobenzene	567	659	604	412	411	522	530				
Dichlorodifluoromethane											
1,1-Dichloroethane							-				
1,2-Dichloroethane	482	304	286			166	208				
1,1-Dichloroethene			- 7				-				
cis-1,2-Dichloroethene			-	-	-	-	-				
trans-1,2-Dichloroethene 1,2-Dichloropropane		-					•				
1,3-Dichloropropane			-				-				
2,2-Dichloropropane	100 S. 710 T										
cis-1,3-Dichloropropene							-				
trans-1,3-Dichloropropene		SAME SECTION	-			The state of	-				
1,1-Dichloropropene				100-100-100		- The state of the					
Ethylbenzene	265	273	268	129		190	242				
2-Hexanone							-				
Hexachlorobutadiene	-	- 007	-	-	-		-				
Isopropylbenzene	388	397	395	135	152	148	138				
p-Isopropyltoluene 4-Methyl-2-pentanone							-				
Methylene chloride						-					
Naphthalene	White PA		-			-					
n-Propylbenzene			3 0 0 0								
Styrene			ROUGH L			2/11/19/19	-				
1,1,1,2-Tetrachloroethane		B 21					-				
1,1,2,2-Tetrachloroethane	13,000	10,300	10,600	2,540	2,140	6,250	9,010				
Tetrachloroethene	27,000	30,600	29,000	15,300	11,900	23,200	24,000				
Toluene 1,2,3-Trichlorobenzene	1,760	1,570	1,560	474	395	1,020	1,280				
1,2,4-Trichlorobenzene				740.50	-		-				
1,1,1-Trichloroethane											
1,1,2-Trichloroethane							-				
Trichloroethene	3,610	3,120	3,020	826	721	2,130	2,600				
Trichlorofluoromethane			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				-				
1,2,3-Trichloropropane		-		1000-00-0							
1,2,4-Trimethylbenzene	DELLA PROPERTY		D. Lees J.	I Factory Sy		-					
1,3,5-Trimethylbenzene		4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-	THE PARTY		N 1 - 10 8					
Vinyl acetate	-					The state of	111111111111111111111111111111111111111				
Vinyl chloride	101	100	- 407			-	-				
o-Xylene	161	162	137	- 500	400	144	161				
m, p -Xylene	924	970	955	522	460	783	842				

TABLE 2 (Revised) S/S/S Treatability Study SOIL SE0190-015: Untreated AIR STRIPPING: SAMPLING @ 10, 30, 60, 135 MINUTES Summary of Total Volatiles Analyses - EPA Method 8260B (Destined for 7.5% Portland Cement, 15% Fly Ash Treatment) Nease Chemical Site Salem, Ohio

Parameter	AS Parent Mixture (μg/Kg)		STATE OF THE PARTY	g/Kg) (j		minutes Kg)	AS @ 60 (µg/	Kg)	AS @ 135 minutes (µg/Kg)		
	0		1	AND REAL PROPERTY.	3		6	_		35	
	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL	
Acetone	40.000	50,000	- 0.000	50,000	-	50,000	•	50,000	- E CEO	34,400	
Benzene	46,200	5,000	8,830	5,000		5,000		5,000	5,650	3,440	
Bromobenzene	-	5,000		5,000		5,000	-	5,000	-	3,440	
Bromochloromethane	-	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
Bromodichloromethane		5,000	-	5,000		5,000	-	5,000	-	3,440	
Bromoform	-	5,000	-	5,000	-	5,000		5,000		3,440	
Bromomethane	-	10,000		10,000		10,000		10,000	-	6,890	
2-Butanone		25,000		25,000	-	25,000		25,000	-	17,200	
		5,000		5,000		5,000		5,000		3,440	
n-Butylbenzene			-								
sec-Butylbenzene		5,000		5,000		5,000		5,000	-	3,440	
tert-Butylbenzene	-	5,000		5,000	-	5,000	-	5,000	-	3,440	
Carbon disulfide	-	5,000	-	5,000	-	5,000	-	5,000	-	3,440	
Carbon tetrachloride	6,640	5,000	-	5,000	-	5,000		5,000	-	3,440	
Chlorobenzene	31,200	5,000	12,100	5,000	9,010	5,000		5,000	-	3,440	
Chlorodibromomethane	-	5,000	-	5,000		5,000	-	5,000		3,440	
Chloroethane	-	10,000	-	10,000		10,000		10,000	-	6,890	
2-Chloroethyl vinyl ether		20,000		20,000		20,000		20,000		13,800	
		5,000		5,000		5,000		5,000		3,440	
Chloroform	•		•				•				
Chloromethane		20,000		20,000		20,000	•	20,000	-	13,800	
2-Chlorotoluene		5,000		5,000		5,000		5,000		3,440	
1-Chlorotoluene		5,000		5,000		5,000	100	5,000		3,440	
1,2-Dibromo-3-chloropropane		20,000		20,000		20,000		20,000	-	13,800	
1,2-Dibromoethane		5,000		5,000		5,000		5,000		3,440	
Dibromomethane	-	5,000		5,000		5,000		5,000	-	3,440	
	3,840,000	12,500	1,970,000	5,000	1,680,000	25,000	1,860,000	5,000	690,000	3,440	
1,2-Dichlorobenzene	3,840,000				1,000,000						
1,3-Dichlorobenzene		5,000		5,000	-	5,000		5,000	-	3,440	
1,4-Dichlorobenzene	30,100	5,000	15,800	5,000	15,800	5,000	13,400	5,000	5,090	3,440	
Dichlorodifluoromethane	-	10,000	-	10,000	-	10,000		10,000		6,890	
1,1-Dichloroethane	-	10,000	-	10,000	-	10,000	1	10,000		6,890	
1,2-Dichloroethane	-	5,000		5,000		5,000		5,000		3,440	
1,1-Dichloroethene		5,000	-	5,000		5,000	-	5,000	-	3,440	
cis-1,2-Dichloroethene		5,000		5,000		5,000				3,440	
							-	5,000	-		
rans-1,2-Dichloroethene	-	5,000		5,000		5,000		5,000	-	3,440	
1,2-Dichloropropane	-	5,000	-	5,000	*	5,000	-	5,000		3,440	
1,3-Dichloropropane	-	5,000	-	5,000		5,000		5,000		3,440	
2,2-Dichloropropane		5,000	-	5,000	-	5,000	-	5,000		3,440	
cis-1,3-Dichloropropene		5,000	-	5,000		5,000		5,000		3,440	
rans-1,3-Dichloropropene	-	5,000		5,000		5,000		5,000		3,440	
1,1-Dichloropropene	-	5,000		5,000		5,000	-	5,000	-	3,440	
	10,100	5,000		5,000							
Ethylbenzene						5,000	-	5,000		3,440	
2-Hexanone	-	2,500		25,000	•	25,000	-	25,000	-	17,200	
Hexachlorobutadiene	11,900	5,000	8,850	5,000	9,200	5,000	10,100	5,000	5,930	3,440	
sopropylbenzene	15,000	5,000	8,120	5,000	7,190	5,000	5,890	5,000	-	3,440	
o-Isopropyltoluene	-	5,000		5,000	-	5,000		5,000		3,440	
4-Methyl-2-pentanone		2,500		25,000		25,000		25,000		17,200	
Methylene chloride		10,000		10,000		10,000		10,000		6,890	
Naphthalene	132,000	5,000		5,000		5,000		5,000	-		
	102,000	5,000		5,000						3,440	
n-Propylbenzene	-		-		•	5,000	-	5,000	-	3,440	
Styrene		5,000		5,000		5,000		5,000	-	3,440	
1,1,1,2-Tetrachloroethane	-	5,000	-	5,000		5,000	-	5,000		3,440	
1,1,2,2-Tetrachloroethane	197,000	5,000	73,900	5,000	71,400	5,000	47,200	5,000	35,000	3,440	
Tetrachloroethene	977,000	5,000	427,000	5,000	324,000	5,000	181,000	5,000	85,000	3,440	
Toluene	36,400	5,000	11,800	5,000	7,390	5,000	1.01	5,000	-	3,440	
1,2,3-Trichlorobenzene		5,000		5,000		5,000	-	5,000	-	3,440	
1,2,4-Trichlorobenzene		5,000		5,000		5,000		5,000		3,440	
1,1,1-Trichloroethane		5,000		5,000	-	5,000		5,000	-	3,440	
1,1,2-Trichloroethane	-	5,000					-				
			24 400	5,000	0.000	5,000	- 0.500	5,000	40.700	3,440	
Trichloroethene	69,800	5,000	24,100	5,000	9,890	10,000	6,580	5,000	10,700	3,440	
Trichlorofluoromethane		10,000		10,000		10,000	-	10,000	-	6,890	
1,2,3-Trichloropropane	-	5,000		10,000		5,000	-	10,000	-	6,890	
1,2,4-Trimethylbenzene	-	5,000		5,000		5,000		5,000		3,440	
1,3,5-Trimethylbenzene	-	5,000		5,000		5,000		5,000	-	3,440	
Vinyl acetate		10,000		10,000		10,000		10,000		6,890	
Vinyl chloride		10,000									
				10,000		10,000		10,000	-	6,890	
o-Xylene	7,990	5,000	40.000	5,000		5,000		5,000		3,440	
m, p -Xylene	39,000	5,000	15,700	5,000	12,300	5,000	6,730	5,000		3,440	
			Barrier B.	Percent	THE STATE OF	Percent	1	Percent		Percer	
	(µg/Kg)	15000	(µg/Kg)	Removal	(µg/Kg)	Removal	(µg/Kg)	Removal	(µg/Kg)	Remov	
Total VOCs	5,450,330		2,576,200	ALL PROPERTY.	2,146,180		2,130,900		837,370	PART I	
Total Percent Removal			1000000	52.7%		60.6%	-	60.9%		84.6%	

Note: From Draft Kemron Table 9

TABLE 3 (Revised) S/S/S Treatability Study SOIL SE0190-016: Untreated AIR STRIPPING: SAMPLING @ 10, 30, 60, 135 MINUTES Summary of Total Volatiles Analyses - EPA Method 8260B (Destined for 7.5% Portland Cement, 15% Lime Kiln Dust Teatment) Nease Chemical Site Salem, Ohio

TO SECURE OF THE PROPERTY OF THE PARTY OF TH	40 D4	Ballanderson		lem, Ohio	AC @ 20	Invitor	AC @ CO	minutes	AS @ 13	E minute
	AS Parent (µg/K	STATE OF THE PARTY	AS @ 10 (μg/		AS @ 30 (µg/	**************************************	AS @ 60 (μg/		RESIDENCE OF STREET	/Kg)
	0		1	0	3	0	6		-	35
	Result	DL	Result	DL	Result	DL	Result	DL	Result	DL
Acetone		50,000		50,000		50,000	-	50,000	-	21,400
Benzene	46,200	5,000	13,600	5,000		5,000		5,000		2,140
Bromobenzene		5,000	-	5,000	-	5,000		5,000		2,140
Bromochloromethane		5,000		5,000		5,000		5,000	-	2,140
Bromodichloromethane	-	5,000		5,000		5,000	-	5,000		2,140
Bromoform		5,000		5,000	-	5,000	-	5,000		2,140
Bromomethane		10,000		10,000		10,000	-	10,000		4,270
2-Butanone		25,000		25,000		25,000		25,000	-	10,70
n-Butylbenzene		5,000		5,000		5,000		5,000		2,140
sec-Butylbenzene	-	5,000		5,000		5,000		5,000	-	2,140
ert-Butylbenzene	-	5,000		5,000	-	5,000	-	5,000	-	2,140
Carbon disulfide	-	5,000	- //	5,000	-	5,000	-	5,000	-	2,140
Carbon tetrachloride	6,640	5,000		5,000		5,000		5,000	-	2,140
Chlorobenzene	31,200	5,000	17,900	5,000	9,570	5,000	-	5,000	-	2,140
Chlorodibromomethane	-	5,000		5.000	-	5,000	- 12	5,000		2,140
Chloroethane		10,000		10,000		10,000	-	10,000		4,270
2-Chloroethyl vinyl ether		20,000		20,000		20,000	-	20,000		8,550
Chloroform	-	5,000		5,000		5,000	-	5,000		2,140
Chloromethane	-	20,000		20,000		20,000		20,000	-	8,550
2-Chlorotoluene		5,000		5,000		5,000		5,000	-	2,140
4-Chlorotoluene	-	5,000		5,000		5,000	-	5,000		2,140
1,2-Dibromo-3-chloropropane		20,000	-	20,000		20,000		20,000	-	8,550
1.2-Dibromoethane		5,000		5,000		5,000		5,000		2,140
1,2-Dibromoethane Dibromomethane	-	5,000	-	5,000		5,000	-	5,000		2,140
									544,000	
1,2-Dichlorobenzene	3,840,000	12,500	3,490,000		2,700,000	25,000	1,740,000	5,000	544,000	2,140
1,3-Dichlorobenzene	-	5,000	- 00 400	5,000	47 700	5,000	40.000	5,000	0.500	2,140
1,4-Dichlorobenzene	30,100	5,000	22,100	5,000	17,700	5,000	12,300	5,000	3,500	2,140
Dichlorodifluoromethane		10,000		10,000	-	10,000		10,000	-	4,27
1,1-Dichloroethane	-	10,000		10,000		10,000	-	10,000	-	-4,27
1,2-Dichloroethane	-	5,000	-	5,000	-	5,000	-	5,000	•	2,140
1,1-Dichloroethene		5,000		5,000	-	5,000		5,000		2,140
cis-1,2-Dichloroethene		5,000		5,000	-	5,000	-	5,000	-	2,140
trans-1,2-Dichloroethene	-	5,000	-	5,000		5,000	-	5,000	-	2,140
1,2-Dichloropropane		5,000	-	5,000		5,000	-	5,000	-	2,140
1,3-Dichloropropane		5,000		5,000		5,000		5,000	-	2,140
2,2-Dichloropropane		5,000		5,000	-	5,000	-	5,000		2,140
cis-1,3-Dichloropropene	-	5,000	-	5,000		5,000	-	5,000		2,140
trans-1,3-Dichloropropene		5,000		5,000	-	5,000	-	5,000		2,140
1,1-Dichloropropene		5,000	-	5,000	17.	5,000		5,000		2,14
Ethylbenzene	10,100	5,000	5,090	5,000		5,000	-	5,000	- 0	2,140
2-Hexanone	-	2,500		25,000	-	25,000		25,000		10,70
Hexachlorobutadiene	11,900	5,000	10,500	5,000	10,600	5,000	9,030	5,000	5,570	2,140
Isopropylbenzene	15,000	5,000	9,390	5,000	7,340	5,000	5,280	5,000	-	2,140
p-Isopropyltoluene	-	5,000	-	5,000	-	5,000	-	5,000		2,14
4-Methyl-2-pentanone	-	2,500		25,000		25,000	-	25,000		10,70
Methylene chloride		10,000		10,000	-	10,000		10,000	-	4,27
Naphthalene	132,000	5,000		5,000		5,000		5,000		2,14
		5,000		5,000						
n-Propylbenzene Styrene	-	5,000		5,000	-	5,000		5,000	-	2,14
1,1,1,2-Tetrachloroethane		5,000	-	5,000		5,000	-	5,000	-	2,14
1,1,2-Tetrachloroethane	197,000	5,000	133,000		87 900		42 200		15 200	
Tetrachloroethene	977,000	5,000		5,000	87,800	5,000	43,200	5,000	15,300	2,140
Toluene	36,400	5,000	590,000	5,000	330,000	5,000	135,000	5,000	33,000	2,14
	36,400	5,000	17,300	5,000	7,220	5,000		5,000	-	2,14
1,2,3-Trichlorobenzene		-		5,000	-	5,000	-	5,000	-	2,14
1,2,4-Trichlorobenzene		5,000		5,000		5,000	-	5,000	-	2,14
1,1,1-Trichloroethane	- 3	5,000		5,000		5,000	-	5,000	-	2,14
1,1,2-Trichloroethane	60.900	5,000	25 700	5,000	10.000	5,000	-	5,000	2 440	2,14
Trichloroethene	69,800	5,000	25,700	5,000	10,600	5,000	-	5,000	3,410	2,14
Trichlorofluoromethane	-	10,000		10,000		10,000	-	10,000	-	4,27
1,2,3-Trichloropropane		5,000		10,000		10,000		10,000	-	4,27
1,2,4-Trimethylbenzene		5,000		5,000		5,000	-	5,000		2,14
1,3,5-Trimethylbenzene	-	5,000		5,000		5,000	-	5,000	-	2,14
Vinyl acetate	-	10,000	-	10,000		10,000		10,000	-	4,27
Vinyl chloride	-	10,000		10,000	-	10,000	-	10,000	-	4,27
o-Xylene	7,990	5,000	-	5,000		5,000		5,000	- 1	2,14
m, p -Xylene	39,000	5,000	21,300	5,000	12,700	5,000	5,370	5,000		2,14
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- F-6	To the last of	Percent		Percent	A CONTRACTOR	Percent		Perce
	(µg/Kg)		(µg/Kg)	Removal	(µg/Kg)	Removal	(µg/Kg)	Removal	(µg/Kg)	Remo
Total VOCs	5,450,330		4,355,880		3,193,530		1,950,180		604,780	
Total Percent Removal	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	20.1%	3,.00,000	44 40/	,,000,100	64.2%	55 ,,,00	88.99
I otal Percent Removal				20.1%		41.4%			1	

Note: From Draft Kemron Table 10

Table 4 (Revised) S/S/S Treatability Study

Phase III VOC Confirmation Testing Results Summary of Total Volatiles Analyses - EPA Method 8260B Nease Chemical Site Salem, Ohio

		Salem, Ohio AIR STRIPPING: 21 Day Cure								ZERO VALENT IRON: 21 Day Cure							
		. 1					111	Cile Duest ²	Zana Valan	4 lunul					9 Lime k	(iln Dust ²	
1 79.51	Air Stripping ¹ Control		Cement & Flyash ² 0190-15 AS Percent			O190-016 AS Percent		Zero Valent Iron¹		0190-01	nt & F	Percent	0190-0		Percent		
									(µg/Kg)		(µg/Kg)		Removal	(µg/		Removal	
TOTAL VOLATILES	(µg/K	g) DL	(µg/K Result	DL	%	(µg/K Result	DL	%	Result	DL DL	Result	DL DL	%	Result	DL	%	
TOENTIEES .																	
Acetone	25,000	50,000	1,260	2,520	95%	690	1,380	97%	16,500	33,000	2,510	5,020	85%	1,470	2,940	91%	
Benzene	46,200	5,000	497	252	99%	311	138	99%	31,500	3,300	251	502	99%	147	294	100%	
Bromobenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Bromochloromethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Bromodichloromethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Bromoform	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Bromomethane	5,000	10,000	252	504	95%	138	276	97%	3,300	6,600	500	1,000	85%	294	587	91%	
2-Butanone	12,500	25,000	630	1.260	95%	345	690	97%	8,250	16,500	1,255	2,510	85%	735	1,470	91%	
n-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1.650	3,300	251	502	85%	147	294	91%	
sec-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
tert-Butylbenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Carbon disulfide	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Carbon tetrachloride	6,640	5,000	126	252	98%	69	138	99%	4,370		251	502	94%	147	294	97%	
	31,200	5,000	287	252	99%	183	138	99%	20,400		251	502	99%	147	294	99%	
Chlorobenzene					95%		138	97%		3,300	251	502	85%	147	294	91%	
Chlorodibromomethane	2,500	5,000	126 252	252	95%	69			1,650		500	1,000	85%	294	587	91%	
Chloroethane	5,000	10,000		504		138	276	97%		6,600			85%		1,170	91%	
2-Chloroethyl vinyl ether	10,000	20,000	505	1,010	95%	276	552	97%	6,600	13,200	1,005	2,010		585			
Chloroform	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
Chloromethane	10,000	20,000	505	1,010	95%	276	552	97%	6,600	13,200	1,005	2,010		585	1,170	91%	
2-Chlorotoluene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
4-Chlorotoluene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
1,2-Dibromo-3-chloropropane	10,000	20,000	505	1,010		276	552	97%	6,600		1,005	2,010		585	1,170	91%	
1,2-Dibromoethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502		147	294	91%	
Dibromomethane	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502		147	294	91%	
1,2-Dichlorobenzene	3,840,000	12,500	75,800	252	98%	48,700	138	99%	2,690,000		114,000	502		56,500	294	98%	
1,3-Dichlorobenzene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
1,4-Dichlorobenzene	30,100	5,000	612	252	98%	374	138	99%	19,500	3,300	934	502	95%	432	294	98%	
Dichlorodifluoromethane	5,000	10,000	252	504	95%	138	276	97%	3,300	6,600	500	1,000	85%	294	587	91%	
1,1-Dichloroethane	5,000	10,000	252	504	95%	138	276	97%	3,300	6,600	500	1,000	85%	294	587	91%	
1,2-Dichloroethane	2,500	5,000	126	252	95%	139	138	94%	1,650	3,300	251	502	85%	147	294	91%	
1,1-Dichloroethene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
cis-1,2-Dichloroethene	2,500	5,000	126	252	95%	69	138	97%	1,650	3,300	251	502	85%	147	294	91%	
trans-1,2-Dichloroethene	2,500	5,000	126	252	95%	69	138		1,650		251	502	85%	147	294	91%	
1,2-Dichloropropane	2,500	5,000	126	252	95%	69	138		1,650		251	502		147	294	91%	
1,3-Dichloropropane	2,500	5,000	126	252	95%	69	138		1,650	3,300	251	502	85%	147	294	91%	
2,2-Dichloropropane	2,500	5,000	126	252	95%	69	138		1,650		251	502		147	294	91%	
cis-1,3-Dichloropropene	2,500	5,000	126	252	95%	69	138		1,650		251	502		147	294	91%	
trans-1,3-Dichloropropene	2,500	5,000	126	252	95%	69	138		1,650		251	502		147	294	91%	
1,1-Dichloropropene	2,500	5,000	126	252	95%	69	138		1,650		251	502	85%	147	294	91%	
Ethylbenzene	10,100	5,000	126	252	99%	69	138		6,250		251	502		147	294	98%	
2-Hexanone	1,250	2,500	630	1,260	50%	345	690		8,250		1,255	2,510		735	1,470	91%	
	11,900	5,000	1,160	252	90%	1,220											
Hexachlorobutadiene	15,000	5,000	1,160	252	90%		138		7,940		930	502 502	88%	769	294 294	90%	
Isopropylbenzene						69	138		9,310		251		97%	147			
p-Isopropyltoluene	2,500	5,000	126	252	95%	69	138		1,650		251	502		147	294	91%	
4-Methyl-2-pentanone	1,250	2,500	630	1,260	50%	345	690		8,250		1,255	2,510		735	1,470	91%	
Methylene chloride	5,000	10,000	252	504		138	276		3,300		500	1,000		294	587	91%	
Naphthalene	132,000	5,000	126	252		69			5,520			502		147	294	97%	
n-Propylbenzene	2,500	5,000	126	252		69	138		1,650		251	502		147	294	91%	
Styrene	2,500	5,000	126	252		151	138		1,650		251	502		147	294	91%	
1,1,1,2-Tetrachloroethane	2,500	5,000	126	252		69	138		1,650		251	502		147	294	91%	
1,1,2,2-Tetrachloroethane	197,000	5,000	126	252		69	138		126,000		251	502		147	294	100%	
Tetrachloroethene	977,000			252		6,230	138	99%	648,000	3,300	16,800	502	97%	6,140	294	99%	
Toluene	36,400	5,000	291			159			23,700					147	294		
1,2,3-Trichlorobenzene	2,500	5,000		252		69			1,650			502	85%	147	294	91%	
1,2,4-Trichlorobenzene	2,500	5,000	126	252		172			1,650	3,300	251	502	85%	147	294	91%	
1,1,1-Trichloroethane	2,500	5,000	126	252		69			1,650			502	85%	147	294	91%	
1,1,2-Trichloroethane	2,500	5,000		252		69	138		1,650			502	85%	147	294	91%	
Trichloroethene	69,800					1,690	138	98%	49,600			502		1,330	294		
Trichlorofluoromethane	5,000			504		138	276	97%	3,300					294	587	91%	
1,2,3-Trichloropropane	2,500			504		138	276	94%	3,300					294	587		
1,2,4-Trimethylbenzene	2,500	5,000		252	95%	69			1,650			502		147	294		
1,3,5-Trimethylbenzene	2,500	5,000		252		69			1,650			502		147			
Vinyl acetate	5,000			504		138			3,300					294			
Vinyl chloride	5,000	10,000		504		138			3,300					294	587		
o-Xylene	7,990			252		69	138		4,750			502		147	294		
m, p -Xylene	39,000			252		145			24,500					147	294		
														14/	294	3370	
	5,650,330		105,002		98%	65,891	14,490	99%	3,819,840		160,167		97%	79,858	30,843	99%	

¹ Air Stripping Control laboratory results from draft Kemron Table 8.

2 Cement & Flyash and Cement & Lime Kiln Dust laboratory results from draft Kemron Table 13.
3 Red results denote non-detects that are listed as 1/2 the reporting limit (i.e., 126)

Table 4a (Revised) S/S/S Treatability Study Phase III SPLP Confirmation Testing Results Summary of SPLP Analyses - EPA Method 1312/8260B Site Nea

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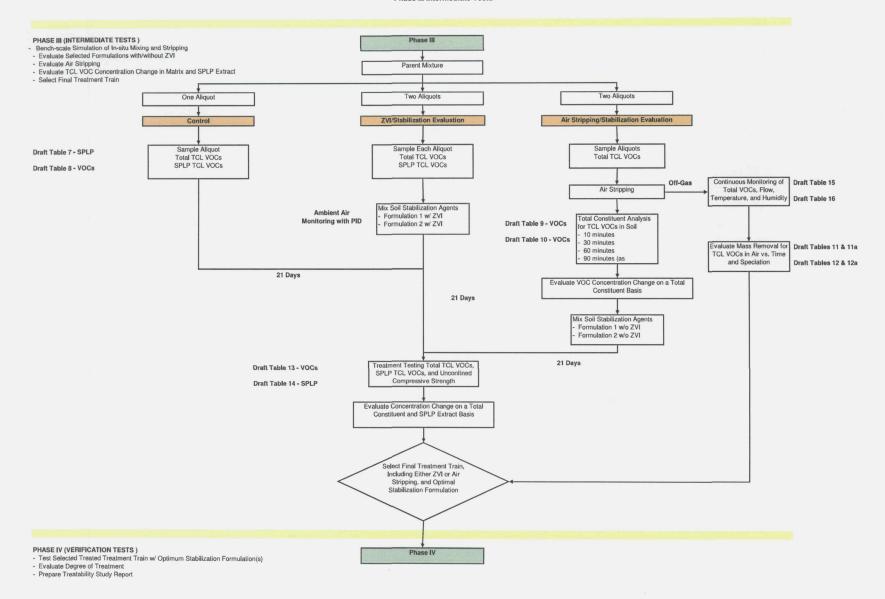
2 No. 1 1 1 1 1				R STRIPPI	-								ON: 21 Day	Cement & Lime Kiln Dust ²		
	Air Stripping ¹ Control		Cement & Flya		ish ²	Cement	& Lime Ki	In Dust ²	Zero Valen	t Iron1	Cem	ent & Flya	ash ²			Kiln Dust
SPLP				15 AS	Percent	0190-016 AS		Percent	Control		0190-0	17 ZVI	Percent	0190-018 ZVI		Percent
	(µg/Kg)			/Kg)	Removal	(µg/Kg)		Removal	(µg/Kg)		(µg/	Ka)	Removal	(µg/K	a)	Remova
VOLATILES	Result	DL	Result	DL	%	Result	DL	%	Result	DL	Result	DL	%	Result	DL	%
VOLATILLES	Nooun	DL	result	DL	70	Ittobuit		70	1.000							
	005	4.050	100	105	700/	25	F0	96%	625	1,250	250	500	60%	250	500	60%
Acetone	625	1,250	130	125	79%	25	50									
Benzene	1,410	62.5	3	6.3	100%	8.61	2.5		1,770	62.5	13	25		13	25	
Bromobenzene	31	62.5	3	6.3	90%	1	2.5	96%	31	62.5	13	25		13	25	
Bromochloromethane	50	100	5	10	90%	2	4	96%	50	100	20	40		20	40	
Bromodichloromethane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
Bromoform	125	250	13	25	90%	5	10	96%	125	250	50	100	60%	50	100	60%
Bromomethane	125	250	13	25	90%	5	10		125	250	50	100		50	100	60%
	625	1,250	63	125	90%	25	50		625	1,250	250	500		250	500	
2-Butanone						25						50		25	50	
n-Butylbenzene	63	125	6	12.5	90%	3	5		63	125	25					
sec-Butylbenzene	63	125	6	12.5	90%	3	5		63	125	25	50		25	50	
tert-Butylbenzene	63	125	6	12.5	90%	3	5	96%	63	125	25	50		25	50	
Carbon disulfide	125	250	13	25	90%	5	10	96%	125	250	50	100	60%	50	100	60%
Carbon tetrachloride	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
Chlorobenzene	890	62.5	3	6.3	100%	6.57	2.5	99%	1,090	62.5	62.1	25	94%	46.8	25	96%
Chlorodibromomethane	63	125	6	12.5	90%	3.07	5	96%	63	125	25	50		25	50	
						3					50	100		50	100	
Chloroethane	125	250	13	25	90%	5	10		125	250						
2-Chloroethyl vinyl ether	2,500	5,000	250	500	90%	100	200		2,500	5,000		2000		1,000	2000	
Chloroform	31	62.5	3	6.3	90%	1	2.5		31	62.5	13	25		13	25	
Chloromethane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
2-Chlorotoluene	31	62.5	3	6.3	90%	1	2.5	96%	31	62.5	13	25	60%	13	25	60%
4-Chlorotoluene	63	125	6	12.5	90%	3	5		63	125	25	50		25	50	
1,2-Dibromo-3-chloropropane	250	500	25	50	90%	10			250	500		200		100	200	
	63	125	25	12.5	90%	10	5		63	125		50		25	50	
1,2-Dibromoethane			6			3	5					50		25	50	
Dibromomethane	63	125	6	12.5	90%	3			63	125					_	
1,2-Dichlorobenzene	67,800	62.5	4,090	6.3	94%	3,360			69,400	62.5		25		33,900	25	
1,3-Dichlorobenzene	63	125	6	12.5	90%	3	5		63	125		50		25	50	
1,4-Dichlorobenzene	522	62.5	20.7	6.3	96%	19.3	2.5	96%	530	62.5	202	25	62%	230	25	57%
Dichlorodifluoromethane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
1,1-Dichloroethane	31	62.5	3	6.3	90%	1	2.5		31	62.5		25		13		
1,2-Dichloroethane	166	125	6	12.5		5.07			208	125		50		25		
	125	250	40									100		50		
1,1-Dichloroethene			13			5			125	250						
cis-1,2-Dichloroethene	63	125	6			3			63	125		50		25		
trans-1,2-Dichloroethene	63	125	6	12.5	90%	3	5	96%	63	125		50		25		
1,2-Dichloropropane	50	100	5	10	90%	2	4	96%	50	100	20	40	60%	20	40	60%
1,3-Dichloropropane	50	100	5	10	90%	2	4	96%	50	100	20	40	60%	20	40	60%
2,2-Dichloropropane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
cis-1,3-Dichloropropene	63	125	6			3	-		63	125		50		25		
trans-1,3-Dichloropropene	125	250	13			5			125	250		100		50		
	63	125				_										
1,1-Dichloropropene			6			3			63	125		50		25		
Ethylbenzene	190	125	6			3	-		242	125		50		25	50	
2-Hexanone	625	1,250	63	125	90%	25	50	96%	625	1,250	250	500	60%	250	500	60%
Hexachlorobutadiene	63	125	6	12.5	90%	14.5			63	125	25	50	60%	25		60%
Isopropylbenzene	148	125	6	12.5	96%	3	5		138	125		50	59%	59.3		57%
p-Isopropyltoluene	63	125	6			3			63	125		50		25		
4-Methyl-2-pentanone	625	1,250	63			25			625	1,250		500		250	500	
Methylene chloride	63	125	6			20	5 5					500				
	50								63	125				25		
Naphthalene		100	5			5.42			50			40		20		
n-Propylbenzene	31	62.5	3	0.0		1	2.5		31	62.5		25		13		
Styrene	31	62.5				1	2.5		31	62.5		25		13		60%
1,1,1,2-Tetrachloroethane	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
1,1,2,2-Tetrachloroethane	6,250		3	6.3	100%	1	2.5		9,010			25		13		
Tetrachloroethene	23,200	125	74.9			128			24,000			50		1,700		
Toluene	1,020	125	6	12.5		5.45						50				
1.2.3-Trichlorobenzene	31	62.5	3			5.45			1,280					25	50	
11-1-1-11111111111111111111111111111111						7.00	2.5		31	62.5		25		13		
1,2,4-Trichlorobenzene	50	100	5	1.0		7.96	4		50			40	60%	20	40	60%
1,1,1-Trichloroethane	63	125	6	12.5		3	5		63			50		25	50	
1,1,2-Trichloroethane	63	125		10010	90%	3	-		63	125	25	50	60%	25	50	60%
Trichloroethene	2,130	125	19.8	12.5	99%	40.8	5	98%	2,600			50		25		
Trichlorofluoromethane	63	125				3	5		63			50		25		
1,2,3-Trichloropropane	125					5			125			100		50		
1,2,4-Trimethylbenzene	63	125	6			3										
1,3,5-Trimethylbenzene	63								63			50		25		
		125	6			3			63			50		25		
Vinyl acetate	625					25			625			500		250		60%
Vinyl chloride	63	125	6	12.5	90%	3	5	96%	63	125	25	50	60%	25	50	60%
o-Xylene	144	125	6	12.5	96%	3	5	98%	161	125		50		25		
m, p -Xylene	783	125	6			3			842			50		109		
													0070	109	1	1 70
	113,559		5,210		95%	3,963		97%	120,177		36,819		69%	39,758		67%

Air Stripping Control laboratory results from draft Kemron Table 7.

Cement & Flyash and Cement & Lime Kiln Dust laboratory results from draft Kemron Table 14.

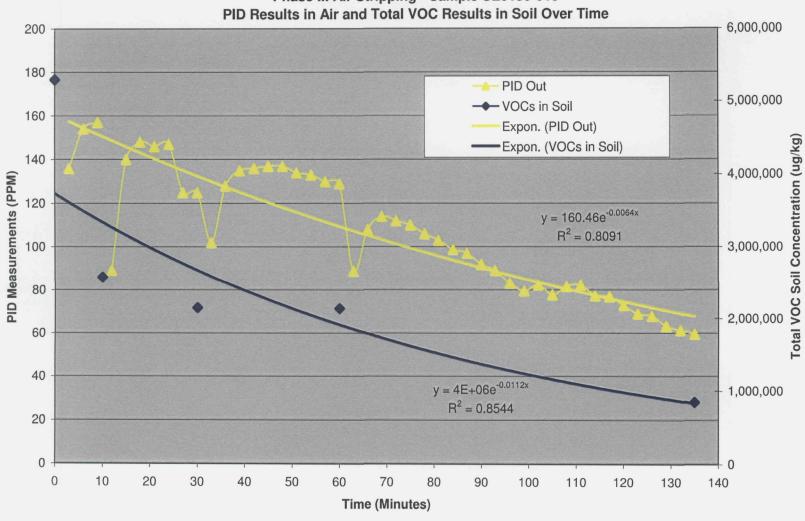
Red results denote non-detects that are listed as 1/2 the reporting limit (i.e., 126)

Figure 1 (Revised) Rutgers-Salem S/S/S Treatability Study Phase III Intermediate Tests



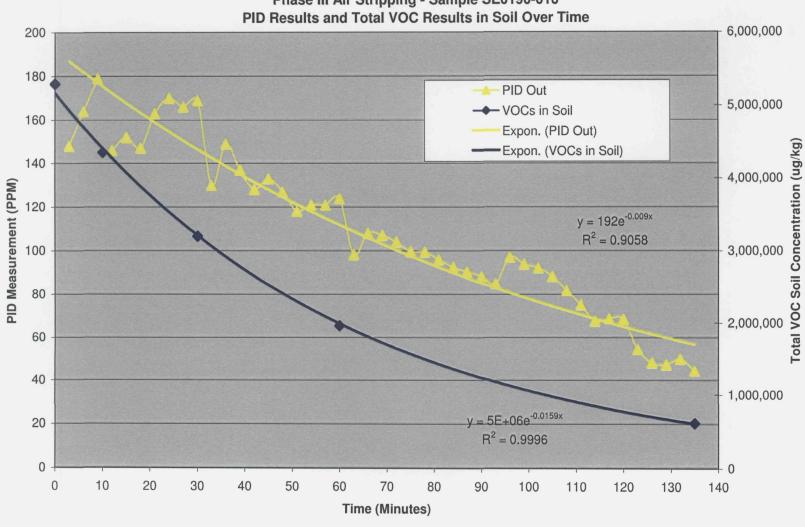
Note:
Draft Tables are from forthcoming treatability study report.

Figure 2
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-015



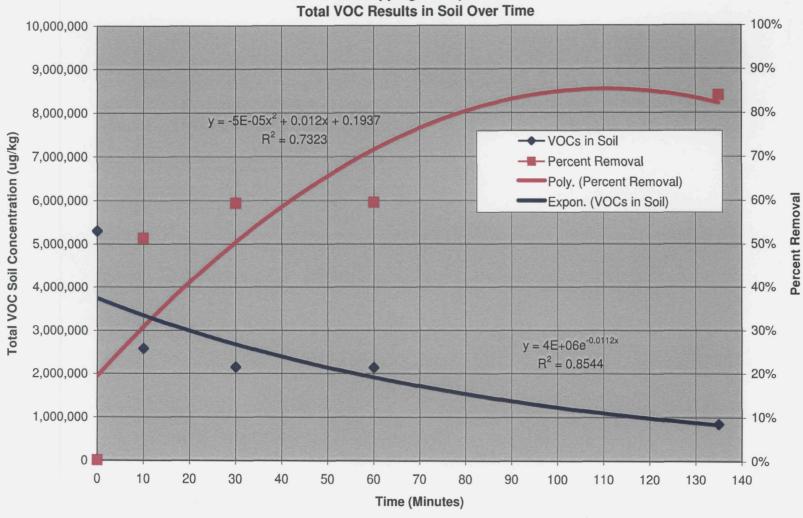
Golder Associates

Figure 3
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-016



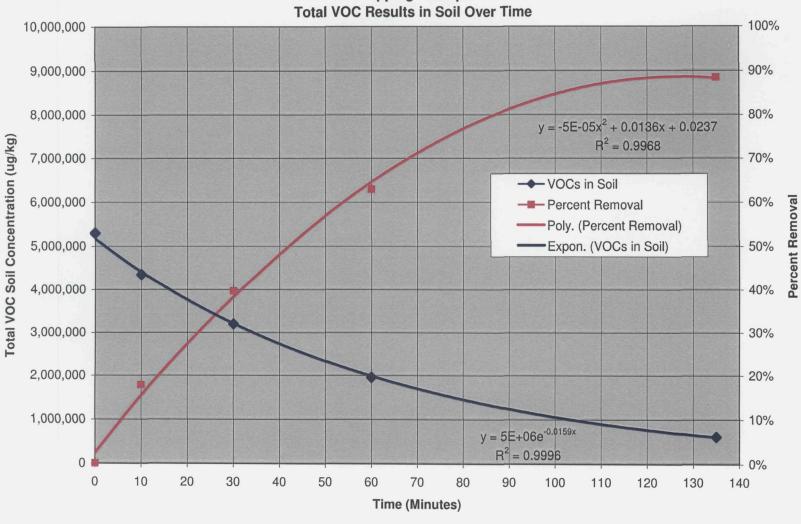
Golder Associates

Figure 4
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-015



Golder Associates

Figure 5
Nease Chemical Site - S/S/S Treatability Study
Phase III Air Stripping - Sample SE0190-016



Golder Associates